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MORE SCHOOLBOARDISM.

We extract from an admirable South London local journal, the *Camberwell News*, the following report as to a School Board summons shewing the Spartan like zeal of the authorities of the London School Board:—

At the Greeenwich police court, a few days ago, Mr. Strachan, superintendent of visitors for the Greenwich division of the School Board of London, attended in support of summonses, to prosecute in which parents were charged with neglecting to send children to school. In the one case, the father of the boy resides in Foxley-street, Brockley, a neighbourhood near the Brockley station, between New-cross and Lewisham, on the line of the London, Chatham, and Dover Railway Company. It was complained that the lad had been for a long time, and was still not attending school, and the defence of the father was that for some time past, owing to the heavy rains and floods, the residents had to use a passage over a fence and across the line of railway to get provisions, and by so doing they rendered themselves liable to a heavy penalty for trespassing, under the by-law of the company. The road to the Board school was impassable from the depth of the mud covered by water, and as a proof of which he exhibited the watertight boots he was wearing to reach the Court, which were wetted and muddied to the top. Police-constable Ford, of the court, said he knew the locality well, the the roadway was in such a state that he should not like a child of his own to go along it to and from the school.—A person among the visitors to the court, who said he had no knowledge of the case coming on, said he could speak to the state of this locality, as he had provided planks to enable residents to cross the water. Mr. Balguy said that, after the description given, he should not convict in the case, but as there was a possibility of fine weather coming, he would adjourn the summons for four weeks, and if during that time there was a proper attendance of the lad at school, no fine would be imposed.

MR. ALFRED SMEE.

The death of this gentleman, whose name has been associated with science for the last forty years, has been announced. Mr. Alfred Smee was the surgeon to the Bank of England, his father having held the same situation before him. Mr. A. Smee was born in 1817; he was elected a Member of the Royal College of Surgeons in 1840, and he became a Fellow of the Royal Society in 1841. Mr. A. Smee's name is connected with a well-known voltaic battery, and one of his earliest works was a treatise on electro-metallurgy, to which branch of science he devoted a large amount of attention. His book, bearing the title of "Electro-Biology," in which he attempted to prove the identity of electricity and life, attracted much attention at the time of its publication, but it was remarkable only as an example of the dangers to which reasoning from analogy may be carried.

The Catalogue of the Royal Society informs us that Mr. A Smee published nine memoirs, two of which were printed in the *Proceedings* of the Royal Society, one "On the Cause of the Reduction of Metals from Solutions of their Salts by the Voltaic Circuit," and the other "On the Structure of Normal and Adventitious Bone." The other papers were published in the *Philosophical Magazine*, except one in the *Journal* of the Geological Society, and another in the *Journal* of the London Electrical Society. The other books written by Mr. A. Smee were "The Potato Plant, its Uses and Properties," "Instinct and Reason," "The Principle of the Human Mind," and more recently "My Garden," a work which shows how deeply a love of natural beauties had imbued his existence.

Mr. Alfred Smee introduced the method of printing Bank of England notes from electrotype plates, thus preserving the original steel plate unworn. In the general election of July, 1865, he was a candidate in the Conservative interest for Rochester, but was unsuccessful.—*Athenæum.*

A PASTORAL.

O! come ye shepherds, come to me!
And pipe, and play for mine and thee;
Let songs of love your notes attune
While bloom the budding flowers of June,
Come pipe, and play!

O! come to these enchanting groves;
Who, into fields Elysian roves,
Lives in a zephyr soft, and sweet;
With moss, and fern beneath the feet,
Come pipe, and play!

O! come to woodlands by the stream,
Where pure, and white the lilies gleam;
Where Damon woos the gentle dove
To listen to his notes of love,
Come pipe, and play!

O! come to where the busy bee
Sucks in the cowslip o'er the lea;
Or where in joy the lambkins play;
Come pipe, and sing the livelong day,
Come pipe, and play!

HENRY GEORGE MELLON.

Reviews.

DARWIN ON FERTILISATION OF ORCHIDS BY INSECTS.

"The Various Contrivances by which Orchids are Fertilised by Insects. By Charles Darwin, M.A., F.R.S., &c. Second edition. Revised, with Illustrations. London: John Murray, Albemarle Street, 1877.

This second edition of Mr. Darwin's admirable work gives the results of his further researches on the subject of the fertilisation of orchids by insects. Perhaps the points on which this new edition differs from that which preceded it will be best understood by quotation of the preface.

"The first edition of this work was published early in the year 1862, and has been for some time out of print. During the two or three years after its appearance I received, through the kindness of various correspondents in differents parts of the world, a large number of letters, especially from Fritz Müller in South Brazil, communicating to me many new and curious facts, and calling my attention to some errors. Various memoirs on the fertilisation of orchids have also since been published, and I have myself examined several new and striking forms. A large amount of matter has thus been accumulated; but the present volume would be rendered much too long if the whole were introduced. I have, therefore, selected only the more interesting facts, and have given a brief abstract of the several published papers. The work has thus been remodelled; and the additions and corrections are so numerous that I have found it impossible to follow my usual plan of giving a list of them. I have, however, appended, in chronological order, the titles of all the papers and books on the fertilisation of the Orchideæ which have been published since the appearance of the first edition of the present book. Finally, I will remark that any reader who wishes merely to see how wonderfully complex and perfect are the adaptations for the fertilisation of these plants had better read Chapter VII. on the Catasetidæ. The account of their structure and of the action of the several parts will, I think, be intelligible, if he will first glance at the explanation of the terms given at the close of the Introduction."

AUERBACH ON ANTHRACEN.

"Anthracen: its Constitution, Properties, Manufacture, and Derivatives; including Artificial, Alizarin, Anthra Purpurin, &c., with their Applications in Dyeing and Printing." By G. Auerbach. Translated and Edited from the Revised Manuscript of the Author by William Crookes, &c. F.R.S., London: Longmans, Green, and Co. 1877.

Mr. Crookes, as the *raison d'etre* of the appearance of an English edition of this very valuable work, truly states that Mr. G. Auerbach's monograph on anthracen and its derivatives is generally recognised both by manufacturers and by scientific theorists as the authority on this interesting and important section of organic chemistry. It presents us with a summary of all important researches on the subject, compiled and digested by one who has made the anthracen derivatives his speciality, and who has had great practical experience in some of the most eminent establishments for the manufacture of artificial alizarin. An English version of this work has been for some time considered as a desideratum by all persons interested in the production and in the application of artificial colouring matters.

When the first German edition of this book (Seehagen, Berlin) appeared four years ago, it was my purpose, the author himself says, to render it as complete as possible, so that every one might find in this monograph all researches bearing upon Anthracen and its Derivatives duly classified, without requiring to search for the memoirs scattered through scientific journals. But if this object was almost attained four years ago, so many novel and important facts have been ascertained since that date, that the book requires to be remodelled and rendered complete. Thus, in a technological point of view, we may instance the discovery of accurate methods for determining the value of anthracen, whereby the utterly untrustworthy processes with alcohol and bisulphide of carbon have been superseded; further, the researches on the formation of alizarin from monosulphanthraquinonate of soda, &c. On the other hand, in the purely scientific region we may mention the beautiful researches of Baeyer and Caro on the synthesis of anthraquinon derivatives from phthalic acid and phenolen; the investigations of Liebermann on chrysammic acid, and many other investigations of distinguished interest.

In general, the plan of the earlier edition has been adhered to, but it has been rendered more systematic. The isomeric compounds have been arranged in groups so as to admit of an easier survey. The arrangement of the bibliographical appendix has been retained as far as practicable.

In order that the work may fulfil its object as a complete monograph of Anthracen and its Derivatives, I respectfully request all chemists engaged in the study of this subject to point out to me any memoirs which may have escaped my notice, and kindly to forward me copies of the journals in which such researches have appeared.

Mr. Crookes states that this edition is founded upon a manuscript copy revised and extended by the author, and we consider that by having passed through the hands of Mr. Crookes, there comes into the hands of the English reader a perfect work as far as may be on this subject.

It would be almost impossible to quote any portion of this work which would well illustrate its contents, it being one continuous and homogeneous treatise on the whole subject, but as being likely to interest many of our readers, we extract from the appendix the following receipts for dyeing with natural and artificial alizarin, printing colours with artificial alizarin, containing 15 per cent. of dry colouring-matter:—

For Red Grounds.—800 grms. alizarin, at 15 per cent.; 1 kilo. acetic acid, at 6° B.; 2 litres water; 200 grms. olive oil; 200 grms. acetate of lime, at 10° B.; 500 grms. wheat-starch; boil well together, stir till cold, and add 200 grms. acetate of allumina, at 15° B.

Very Dark Red.—3,300 grms. alizarin, at 15 per cent.; 10 litres thickening; 490 grms. nitrate of alumina, at 15° B.; 600 grms. acetate of alumina, at 12° B.; 500 grms. acetate of lime, at 16° B.

Red for Mille Fleurs Styles.—2,600 grms. alizarin, at 15 per cent.; 10 litres thickening for red; 300 grms. nitrate of alumina, at 15° B.; 600 acetate of alumina, at 12° B.; 400 grms. acetate of lime, at 16° B.

MEROË.

"Meroë:" A Poem in six books. By W. Laird-Clowes. London: Printed by J. Wakeham, Bedford Terrace, Kensington; and sold by D. Daniell, 74, Brompton-road, S.W.

A book, printed and issued simply, however great its merits, is not likely to find a large number of readers. Whoever wishes to be heard, must pass his book through a publisher. In this poem the author endeavours to show that the more cultivated classes of the ancient Egyptians and Greeks were not satisfied with the religious doctrines of their priests. We cannot deny that there are sufficient facts extant to prove this were we to refer to Herodotus alone, and as Cicero styled him the father of history, we have greater reason to credit the records of the 87 Olympiad.

A more ambitious poem in blank-verse, with syllables in sequence, we have not read for some time; and Mr. Laird-Clowes handles his characters with some subtlety, though not always well sustained, but this is excusable, as the poem has no pretensions to the drama. The work, though it introduces Amasis, Cambyses, Nytetis, and Phanes, and commences in 526 B.C., does not pretend to be of archælogical reliability throughout. The following from Book 1 has all the perfection of blank-verse: the *rhythm* of which is little understood by writers of the present day:—

> "'Twas evening, and the sun went down to rest
> Upon a gloomy pillow, black with cloud;
> The western sky was red as though with fire,
> And, as the darting gleams shot up and died,
> A heavy darkness settled o'er the sky,
> The pleasant breeze of sunset grew apace,
> And freshened as it swept across the Nile."

The character of Meroë throughout the poem wins the reader; especially where she is carried from the field "half-dead with fear;" or the following:—

> "She sat and thought; when, at the window high,
> When to the chamber came its only light,
> She saw a little bird that twittered there."
>
> * * * * *
>
> And, as she sang, the silent wings of night
> Outspread their shadow; and her hope died down
> To hear the moaning herald-wind of eve
> Sigh out its sorrow in the rustling leaves
> That roofed her prison.

Some of the lines, descriptive of the battle, remind us of Milton, where the fallen angels are gathered again to war; and the interest increases as we reach the closing scene. The poem is classical, exhibits more learning than the few known mythological poems; but historically, will not be found sufficiently orthodox to gain the admiration of the Greek scholar who receives the religious customs as historical facts, rather than romance.

MILITARY DICTIONARY.

"Military Dictionary." By Major General E. Voyle, retired Royal (Bengal) Artillery, assisted by Captain G. de Saint Clair-Stevenson, F.R.G.S., ancien officier d'etat major auxiliare. W. Clowes and Sons, 13, Charing Cross. 1876.

This is the 3rd edition of a very handy work produced last November, which, though it appears at first sight simple in compilation, will, like a good law directory, be found to be the result of much practical learning. It contains tables such as the one illustrated by the "Figure of Merit" (which denotes the efficiency of the shooting of a squad company or battalion) of an instructive character. We require, however, to premise the fact, upon which the publishers insist that it is a book which the general public will do well to purchase, as it has been purposely arranged to aid in rendering the newspaper accounts of, and books as to, modern warfare, intelligible; while engineer and artillery officers will find it a great assistance.

The article under Ballistics, the science of the motion of projectiles, is worthy of mention. It is divided into two distinct parts, according to whether the projectile is supposed to fly through empty space or through the resisting medium of the air. The calculations based on the former hypo theses, and found to tally with the results of practice, with shells of large calibre fired with small initial velocities, and consequently short ranges. The trajector is supposed to be a parabola. When the velocity of the shells increases, the formulæ of the parabola have to be altered by certain co-efficients calculated with the assistance of the French artillery tables. The problem is geometrically presented and elaborately worked out.

Besides the majority of essentially military words, there are a number like Plantations, Plank, Uniform, of a general character, but the meanings are very good. As a sample of the contents of a page, we give the words of one at random: "Besieging Army, Blockading Army, Breech Action, Britttleness, Broughs, Bugle, Bungalow, Button." The interpretation of the "steam-engine" is taken from Weale's series. All kinds of manufactures, including the "steam-hammer," are described. The important information given under "Austrian Field Gun," that the Austrians are about to change their bronze guns, which comprise all their field ones for steel, of their own design.

This work will be of use to Inventors, as so much may yet be done in improving military material.

LESSONS IN ELECTRICITY.

"Lessons in Electricity, at the Royal Institution, 1875-6." By JOHN TYNDALL, D.C.L., LL.D., F.R.S., &c. London: Longmans, Green, and Co. 1876.

It would be superfluous for us to dilate upon the great services rendered by Prof. Tyndall to science. To those who desire a lucid, clear, and also a simple description of any scientific subject bearing on Physics, without profuse technicalities, we may point to the works of Professor Tyndall, who, we venture to say, has done more than any living scientific man to popularise science as a study; one of his great points being to place facts and experiments before the world in such a way that those having but a smattering of knowledge of science may peruse his works with advantage.

His last work, that now under review, fully bears out the above. Here we have Lessons on Electricity, which, we think, any one having but a slight acquaintance with the science may read and understand. Of course we do not infer by this that the reader would thoroughly understand the great subject of electricity even in part, but he certainly would understand the why and wherefore of various points of it, for by the clear expressions and illustrations which characterise the expositions, the learner is conducted step by step from the first historical facts up to those of the latest date. We heartily commend to our readers this little work.

ELEMENTS OF PHYSICAL MANIPULATION.

"Elements of Physical Manipulation." By EDWARD PICKERING, Thayer Professor of Physics in the Massachusetts Institute of Technology. Part II. London: Macmillan and Co. 1876.

When the first part of this valuable work was published we in our review of that part, gave our hearty support to it. Now that we have the second part under review, we have to confirm what has already been said of the first part.

The vast number of science teachers that have grown up within the last few years, will find this work of very great service to them. The arrangement of the various experiments is thus:—Each experiment is divided into two parts; first we have a description of the apparatus required, and then the details of the experiment, and these two parts are respectively allotted by the author to the instructor and the student.

The subjects dealt with in this second part are—electricity and heat, mechanical engineering, meterology and astronomy. A chapter on lantern projections, and several appendices are added, containing tables for the use of students and others; also directions for establishment of physical laboratories, and further, a list of works of reference.

The arrangement of the work is worthy of all praise, and its two parts will be found invaluable to the student, and also to those who conduct independent research in the vast field of science.

REVIEWS POSTPONED.—"The Effects of Cross and Self-Fertilization in the Vegetable Kingdom." By CHARLES DARWIN, MA., F.R.S., &c. London: John Murray. 1876. Also Advanced Reading Books, published by Mr. Murby.

Correspondence.

THE EFFECT OF VACCINATION.

To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

SIR,—The present small-pox epidemic naturally resuscitates the vexed question of the value of vaccination, in connection with which I would ask you to open your columns to the following considerations:—Recent biological researches show that the lower and smaller the organism, the greater the likelihood of its possessing the power of *asexual* multiplication, either alternately with *sexual* or for an indefinite number of successive generations, occasionally interrupted by the normal sexual process.

This is usually, if not invariably, accompanied by heterogenesis—that is to say, the successive members of the series differ more or less widely one from another; in some instances being so dissimilar as to have been mistaken for distinct species. Nor are they unlike only in form and outward show, but also in action, habit, and mode of life.

Now, little is known of small-pox and other miasmatic diseases beyond the fact which is now fairly established, that they are caused by the intrusion into the human body of very minute fungoid organisms, probably not unlike the *peronospora infestans* or common potato disease, only much smaller.

There is the highest probability that the small-pox fungoid multiplies heterogenetically, and many considerations, not necessary to specify here, have led me to believe that the spores or rejuvenated individuals of such miasmata, endowed as it were with a new lease of life, are provided with the means of traversing wide areas, borne on the air, either owing to their own minuteness or to their being furnished like many well-known seeds with suitable appendages.

If this is so we at once see how it is that whereas small-pox on the one hand is infectious, cow-pox, on the other hand, as conveyed by vaccination, certainly is not. This is at once accounted for on my hypothesis by assuming that the former consists of the plant in its normal or sexual stage, and the latter of the same plant in its abnormal or asexual stage. The fact just adverted to has, it seems, satisfied many persons that cow-pox and small-pox are not merely two allotropic forms, so to speak, of the same plant, but altogether distinct species; but this is easily disproved by inoculating cows (as has often been done) with variolous matter from a small-pox patient, when true cow-pox invariably results.

When a person is vaccinated, the true small-pox plant is introduced into his body in the unfertilised state, and propagates itself through his system by what has been aptly styled "discontinuous growth."

These considerations have led me into a long train of reasonings, with which I must not trespass upon your valuable space. But I will confine myself to one reflection, which is discouraging to those who are very enthusiastic advocates of vaccination.

If our miasmatic fungoid may thrive in two allotropic forms, why not in three or more? Indeed, it is admitted that horses inoculated with cow-pox manifest symptoms quite unlike either the usual small-pox or cow-pox symptoms. True, it does not follow that the plant is metamorphosed, still less that such possible metamorphosis could take place without changed environment, and the question is whether a given fungoid may possibly exist in the human body in three or more allotropic forms. Unfortunately this question must be answered in the affirmative. We have only to pass to the consideration of a too well known enteric disease (also supposed to be due to a fungoid) and we find it flourishing in what are known as its primary, secondary, the tertiary forms. Here the plant, after entering upon its new and virgin soil, produces a crop, and then appears to die down and lie smouldering as it were for a year or so. It then springs forth again into bloom, but in altogether a novel form, and again dies down,—usually for good. But not unfrequently, after smouldering for years (sometimes as many as twenty), it appears for the third time, again in a new guise, and far the most horrible.

Now, to return to small-pox; most medical men assure us that its victims, even when they recover, are found to contain the seeds of consumption, and to be liable to diseases of the circulatory organs. For this I cannot vouch, nor am I aware that statistics are forthcoming in support of this view; but I have it on the highest epidemiological authority, and it may be true.

And what then? Why, it follows that if the small-pox fungoid which has spent its fertilising force is still competent to blossom forth anew in the form of some disease of the circulatory organs, then the same plant in the same condition (viz., cow-pox per vaccination) is quite competent to produce the same results. If this is so, we ought to find an increase in the number of deaths from diseases of the circulatory organs *pari passu* with the spread of vaccination. Let us turn to Dr. Farr's letter to the Registrar-General, published in the Appendix to the 37th Annual Report of the Registrar-General of Births, Deaths, &c. He says, "There is a general increase in the deaths from all these diseases (local diseases). The increase in the fatal diseases of the circulatory organs is the *greatest*."—I am, Sir, yours obediently,

WORDSWORTH DONISTHORPE.

17, Porchester Terrace, W.
Jan. 14, 1877.

FOREIGN SCIENCE.

It is true that at the season just passed the reading public, scientific or otherwise, is chiefly bent on pleasure; and improvements in machinery, and the problems of the various so-called "ologies," are laid aside under the gladsome influence of the holly and mistletoe, but ere many days of the year so big with fate had elapsed, our readers and scientific men generally, necessarily resumed consideration of such topics. At this season many new works in science are brought out, and we venture to give a brief account of some of them, which may interest now the feast is over.

We ought to have mentioned in our article under this head, in the impression of last month, that the interesting and lengthy works reviewed in the first instance may be obtained from Messrs. Bailliere, Cox, and Tyndal, Charing Cross, and the work in German, *Anthropogenia*, from Messrs. Williams and Norgate. The latter firm have received for this year a new work in arithmetic in the French language. Lessons in arithmetic by M. Tessot, a former Professor of the Lycée. Not only commercial men, but also persons interested in science who have to make calculations would do well from time to time to place in juxta-position foreign systems with our own. It is perhaps even indispensible for a good mathematician to consider a new French treatise of the kind. We chiefly value this work for the portions devoted to the higher branches; but even the part on fractions deserves praise.

In order to give our readers a glimpse of current transactions on the continent, we have perused the recent numbers of our old acquaintance *Cosmos*. Amongst important items we have to instance the instalation of M. Bischofshiem's grand instrument—the Meridian Circle, with great telescope (seven inches à retournement)—in the Observatory of Paris in the perfect conditions of solidity, facility of manipulation and of temperature, which will make it an instrument of the first order. A subject is under experiment just now in Denmark which we need not say would be of the greatest value when fairly made out in London, viz., the rapid drying of buildings. Our readers must know how much the public suffers here from deficiencies in this respect. M. M. L. Kruse has endeavoured to affect a cheap and effectual arrangement. He has submitted the plan of a five storey house, which could be dried in forty days. To give an idea of the quantity of water there was to vaporise, it has been calculated as follows for a single story: The measure of the walls which surrounded and separated the pieces was 142 cubic mètres, which, with 1,860 kilos. the cubic mètre (3ft. 3in), weighed 265,000 kilos. Estimating at the minimum of five the 100 the dampness of the masonry, and adding to it that of the carpentry, it was found that the quantity of water to vaporise and eliminate at this stage was at least 16,000 kilogrammes. It was therefore necessary to have recourse to as energetic a ventilation as possible as well as a strong elevation of temperature. M. Kruse operated as follows: a coke furnace was placed in the cellar near each chimney, and worked an opening in this at a convenient height of 0^{m} 50 in breath, by 50 in height, taking care to isolate the furnace in a case of light masonry. Each chimney had been stopped in the higher part, and at every story an opening of the same dimensions as the preceding; about 0^{m} 75 of Plafond had been managed. The different storeys having been dried successively, and relative openings formed in proportion; the products of combustion, mixed with warm air, were so launched into the different storeys and evacuated with the steam of the disengaged water across a special opening, a sort of moveable drum being adapted at the crossings, and affording an evacuation at the bottom, on the level of the floor. This drum also allowed the feeling of the departure of the air to rise in relation to the direction of the wind. In three days every storey was dried, seventeen tons of coke were burnt, and a single workman sufficed to survey the furnaces. The Abbe Mognio says, this is perhaps the simplest and most perfect method yet invented. *Cosmos* takes notice of the ventilation of the ship *Malabar*, English transport,; also of the new system of warming and ventilating the Theatre Royal, at Copenhagen, and in one of the latest numbers goes into the warming and ventilation of the Parisian schools. We may presume the subject to be much in discussion at present in France. It appears that a rain of dust fell at Boulogne last November, which the savants and, of course, the quid nuncs, are accounting for; also an extraordinary fall of hail at Grotta Farrara.

M. Lecoq de Boisbaudrau, of Gallium, notoriety writing to *Cosmos* says, "The metallic gallium crystallised under the form of very neat octaedres trunked at the base. The surfaces are not plain enough to allow exact measures, the meaning of which I found by the angles appeared nevertheless to conduct to a clinorhombic form. We beg to call attention to the fact that in these columns appeared probably the first practical notice in this country of the discoverer of this metal and additional particulars were given in various numbers. We refer scientific men to the numbers for the past year for information.

DRAMATIC LITERATURE.

It would scarcely be polite to the particular season of the year to pass unnoticed the joyous pantomime which for so many years has been patronised at this time by all classes of the British public. It is true that the quality of elegance has been introduced not a little on the London boards, and that, perhaps, in some of the better provincial theatres a more beautiful adherence to the good old style will be found. Still we are favoured with enjoyable representations, and a nice one is played twice a day, at 2.30 p.m., and in the evening at the Aquarium Theatre, Westminster. This theatre occupies the far end—looking from the commencement of Victoria-street—of the Royal Aquarium, an institution liberally patronised by the visitors. It was established by the sale of shares, the holders of which are in a great many instances distinguished members of the *beau monde*. The interior resembles a large temple, and the ornamentation in it is in keeping. Besides general efforts to popularise science, the committee provides various amusements, such as Mrs. Howard Paul's entertainment, the Royal Punch and Judy, Holden's Marionettes, &c.; but the Pantomine by Frank Hall, Esq., "Twinkle, twinkle, little star, or, Harlequin goody goose and her good little geese," is naturally the favourite. The manager wisely admits all "the blue-eyed banditti," that is to say, he does not make an exception in favour of the half-puns of "goody-goody" youngsters only.

The Aquarium Theatre may be termed a cosy house, a drawing theatre if it were not quite so large. Everything is bound in claret, or somewhat similarly coloured cloth, from the pit to the ceiling. The portion answering to the gallery is boxed and divided like the dress circle or upper boxes. The gods possibly resent this attempt to make them take their mirth in a form of modern civilisation, for very few of them were visible at the morning performance, which we have the pleasure to review. A tolerably numerous audience occupied the other portions. Willie Wildgoose, son of an old friend, Dame Goose, "such a good boy, strange to say," not fond of guzzling when he was young, is in love with pretty Alice, daughter of Squire Barleycorn, and is rivalled in her affections by the only son of Baroness Lubberkino, head boy at Dr. Tucker's school, come on in a variety of scenes, with the accompaniment of good comic actors, and grotesquely masked "supers," till the grand transformation, Alice in Wonderland; or, the End of the Rainbow, a scene resplendent with golden circlets and flowers, many coloured lights, transparent screens and magic waters. The acting of Miss Annie Merton as Alice, and Miss Bessie Bonehill as Will was very good and graceful. They sang in duet the popular song, "Carrying on the same Old Game," in a way which redeemed it from the hacknied—indeed provoked a seriously enthusiastic feeling. The dances and fun of these and the male artistes were really amusing, because the tiresome nonsense with which the public is often regaled had no place. The fight between Dame Goose and Squire Barleycorn—we are not quite sure of the identity of the egregious gentleman—was capital, the runs and *poses* of the dame being quite *original*. The scene of the Baroness Lubberkino's Castle calls for notice on account of the nice effect of the body guard of children and girls in armour, and the appearance in character of two of the former, King Pigmy and Queen Weeny. The little Howe, a little girl dressed as a sailor, sang between the scenes with much applause. We must praise the scene the Home of the Fairies on account of the beautiful way in which a shallow lake in a forest was presented. The distance effects were admirable, a great improvement has taken place within recent years in that respect. It still might be worth the attention of inventors to effect new distances in the stage as of the mechanism. The masks were unusually good. In regard to the harlequinade, columbine was presented in a spirited way by Miss Ada Gordon. There was a capital scene in which the clown and pantaloon had taken quiet lodgings, and rushing out in their bedgowns in the middle of the night, find that there is a gentleman playing a huge brass instrument at one window, and a blacksmith's forge, and pyrotechnic explosion on the ground floor. All the *rôles* were well acted.

NATURE v. MATHEMATICS.

The greater and more massive the supertructure of Science becomes, the more persistent appears to be the dislike of its votaries to investigate the accuracy of the *data* upon which their conclusions are based! For the sake of consistency and convenience it is no doubt agreeable to believe that this globe in particular, and the universe in general, are subject to laws founded upon mathematical abstractions; but Nature herself is just as apt in her physical, as in her moral aspects, to resist dogmatic theories, and to hold up their professors to derision at the very climax of their imaginary triumph! From time to time independent thinkers rise up to startle and astonish the scientific world, by unexpectedly showing it that it may for years, nay for ages have been dwelling in "a fool's Paradise," or at any rate have been stumbling upon truths by methods essentially empirical and defective! Among such thinkers may fairly be accounted the Rev. Percival J. Brine, one of the Senior Fellows of King's College, Cambridge, whose striking and original remarks upon some vital questions in Natural Philosophy we had occasion to notice some months ago. This courageous inquirer is, we understand about to publish another series of photographic illustrations of the doctrines he seeks to establish in regard to the relations between Light and its Reflection. His main object is to prove that the prevailing mode of measurement by the sextant cannot always be depended upon for coast lines and marine distances, and that disasters by sea are the frequent result—a "startling" state of things—if correct – as our contemporary the *Times* pointedly remarked in a recent *Article* upon the loss of the Troop-Ship St. Lawrence. Whether right or wrong, therefore, in his views, Mr. Brine's motives are certainly laudable, and as a close and experienced observer of Nature in all her moods, and throughout her entire area, his opinions ought to command attention, even where they fail to secure acquiescence.—*Bell's Weekly Messenger*.

The Inventor of the Steam-whistle, a man whose name is scarcely known, but who has been the means of making much noise in the world, is dead. Adrian Stevens, the inventor of the steam-whistle, died on Christmas Day, at his residence at Merthyr Tydvil, at the age of eighty-one. As a civil engineer, Mr. Stevens was well known and appreciated at and about Dowlais and Penydarren. The claims of Mr. Stevens were brought before the scientific world some few years since, and a subscription was raised, which gave the inventor of the steam-whistle the comforts he required in his old age.

Another Poor Inventor, Mr. Alexander Bain, well known as the inventor of the electro-chemical telegraph, which has been extensively used in America, and, after years of neglect, is now being revived in this country, died a few days since in the Home for Incurables, near Kirkintillock, having been afflicted with paralysis for several years.

MORE PATENT OFFICE MISMANAGEMENT.

It is said that all printed specifications of expired patents, excepting only five copies of each, are to be destroyed. It would be interesting to know who is really responsible for such a scandalous waste of public property. It is perfectly astounding that useful books, which have cost many thousands of pounds wrung from inventors, should thus be destroyed, utterly regardless of the public good. Into almost every lawsuit the specifications of expired patents are necessarily imported, consequently five copies is a totally insufficient number to keep in stock, for that number would not suffice to meet the requirements of a single case. Not only so, but it is the constant practice of parties who think their rights have been infringed, as also of parties charged with infringements, to submit copies of specifications to professional men with a view to being advised on the course they should pursue, and many lawsuits are thus averted. Moreover, many intending patentees make preliminary searches, and submit for the consideration of their advisers those specifications which appear to bear most closely upon what is sought to be patented. In this way, by having the printed specifications before them, professional men are enabled to settle the specifications and claims of their clients so as to keep them within proper limits. But what will be the state of things when the printed specifications are not forthcoming? Either the professional man will have to spend a large portion of his time in the already crowded Patent Office, or the unfortunate inventor will have to pay for manuscript copies of specifications and tracings of drawings and to put up with serious – it may be fatal – delay; and this is what will arise in the majority of cases—he will give the matter up in disgust and elect to take his chance, a course calculated to be very fruitful in litigation. Although the Commissioners of Patents are nominally responsible, we cannot think the order for this act of wanton destruction can have originated with them; possibly—for in this department all things are possible—it has been given without their knowledge.

We do not know whether or not the work of destruction has yet commenced. If it has, it ought to be at once stopped. If not commenced, all thought of it should be abandoned, certain as it is to do incalculable harm without effecting any corresponding good. It is high time that something be done to put a stop to the vagaries of those who seem to be just now having it all their own way in Southampton-buildings.—*Engineering.*

SAWING GRANITE.

Among the interesting things that were shown to the architects in Philadelphia, during their convention, was the patented process of Messrs. Struthers and Sons, for sawing granite. Hitherto it has been found impracticable to cut granite with a saw, since the ordinary sand process would cut only an inch and a half or two inches per day. The inventor of the Messrs. Struthers' process hit upon the idea of using chilled iron, finely divided, instead of sand. A jet of steam is directed upon a fine stream of melted iron, and blows it into spray, just as in the common atomizer a jet of air pulverizes, so to speak, the stream of liquid upon which it is turned The iron, divided into fine globules of, say, a fortieth or fiftieth of an inch in diameter, falls into cold water, and is chilled into excessive hardness. It is used under a saw of soft iron, and with a stream of water. as sand is used in sawing marble. Most persons would have supposed that the scratching of angular grains of sand would be more efficient than the rolling friction of globules of iron; but it would seem that the sand is speedily crushed into dust, while the tough iron, simply wearing down into smaller and smaller globules, crushes its way through the felspathic and other crystals of the granite (which with us is usually sienite, by the way, and not granite). The rolling of the globules is curiously shown by fine channellings or flutings, which score the under edge of the saw from end to end. By this device granite can be sawn at the rate of three or four inches per hour. and at small expense; the waste of the iron being about three pounds for every square foot of kerf, or two square feet of sawn surface. For small blocks, where a saw can be used that is short enough and therefore stiff enough to bear a heavy pressure without buckling, it is found possible to cut at the rate of twelve or fourteen inches per hour. The surface obtained by sawing is vastly better prepared for polishing than a hammered surface, not only because it is smoother, but because by hammering the surface of the stone is "stunned," as it is termed: that is, the crystals are so bruised and shattered below the surface that it is necessary, before the polishing can begin, to grind away an eighth of an inch or more, which is unnecessary with a sawn surface. *American Architect and Building News.*

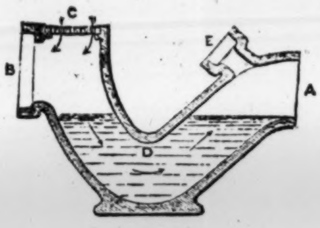
A SIMPLE FORM OF SYPHON AND VENTILATOR TRAP.

In the absence of provision for sewer ventilation, it is now tolerably well recognised that sewer air does, more or less, find an entrance into any building with which the drainage scheme is connected. Such every-day appliances as bell traps, D traps, syphons, &c., with which 99 per cent of houses are furnished, having any claim to drainage at all, readily permit of the discharge of gaseous sewage into the various offices of the building they are connected with, either by defective joints or materials, by simply forcing the water-seal, and blowing into the interior; or by the subtiler and more frequent mode of conduction through the water.

Where the sewer and drain are ventilated by rain water down spouts, or by the soil or other pipes conveying fluid refuse, by apertures at the upper ends, it is not so widely known that injurious results often follow—nay, amongst jobbing builders and their staff, to whom is generally left the care of the house, it is a standing article of belief that a sewer ventilating into the street, and the drain by an upright pipe, mal-odours cannot exist in a house from this source. A considerable improvement is to ventilate the sewer by one channel, then outside the house wall to introduce a syphon trap, so as to obstruct aerial connection between the house and sewer, leaving, as before, the upper orifices of house pipes open to the outer air. Even this course is not always satisfactory, because air currents within the pipes are often downwards, and the vaporeus emissions from foul pipes, and that which passes the syphon by conduction, are blown into the house. On this subject the general opinion would seem to be, that given a tube open at its summit, discharging effete matter, there is an upward aerial flow. This, however, is by no means so universally.

Mr. Weaver's plan of dealing with the evils above referred to is carried out by the use of a compact convenient form of syphon ventilator suitable for house and sewer purposes, which for efficiency, simplicity of form, economy of space, certainty of action, non-liability to derangement, or stoppage by stilting or floating materials, for which the lines and curves are especially designed to avoid, will, it is hoped, meet a universal want amongst householders, whether tenants or landlords, adapted to all descriptions of drainage in town or country. Messrs. Stiff, of the London Potteries, Lambeth, are the manufacturers of the apparatus, and supply it at a charge very little above the price of common syphon pipes, which is really so reasonable as to be within the reach of every cottager. The inventor is Mr. Richard Weaver, C.E., F.C.S., who has had much experience as a sanitary engineer.

In the accompanying illustrations, A is the outlet to sewer, B inlet from house, C fresh air inlet, D dip of trap ($3\frac{1}{2}$ inches), and E junction to ventilate sewer.



INTERIOR.

EXTERIOR.

The trap is to be fixed with its base quite level in the line of pipes outside the building. The junction E to be connected with a rain water or a special upright pipe carried to the house top clear of windows and chimneys. The air inlet C must communicate with the atmosphere by pipes brought to the surface of the area or yard, where the gird may be placed to carry off water. If more convenient, a pipe may be attached to a wall and carried up a few feet.

All soil, bath and slop pipes must communicate with the air outside the house by short pieces of pipe with open ends pushed through the walls.

The lines of the trap are designed to convey floating and sedimentary matters without obstruction, but if stoppage occurs it is removed by the fresh air inlet C.

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Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President, SIR ANTONIO BRADY.

SESSION 1876-77.

MEMBERS' MEETINGS AT 8.15 P.M.

THURSDAY, 8th Feb.—Patent Law Conference.
THURSDAY, 22nd. Feb.—Exposition of Inventions.
Executive Council Meetings same days at half-past 7 p.m.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts. F. W. CAMPIN, Sec.

N.B.—A movement for the REDUCTION OF PATENT STAMP DUTIES *is now on foot; those who wish to support it should at once communicate with the Secretary.*

Proceedings of the Institute.

On 11th of January, 1877, the Executive Council met, and was presided over by F. H. Varley, Esq., C.E., its Chairman. After the confirmation of the minutes of the last meeting, the secretary reported that the resolution of the last meeting as to the Patent Laws had been forwarded to the Lord Chancellor. Also, that he had had an interview with the Secretary of the Society of Arts in order to ascertain if that Society would be likely to co-operate with the Inventors' Institute in regard to adding to its proposals the Reduction of the Stamp Duties on Patents, but the Secretary of that Society seemed to think there was very little chance of obtaining any such co-operation; however, application had been made to the Council of the Society of Arts on the subject, but no answer had been yet received.

The Executive Council then arranged the course to be adopted in the event of the Council of the Society of Arts agreeing to an interview with the Executive Council of the Inventors' Institute.

Instruction was given to the Secretary to write to different societies on the subject of Patent Law Reform.

It was also arranged that the principal point to be placed before the Society of Arts would be, that without the reduction of the Stamp Duties on Patents, any amendment of the Patent Laws would be all but valueless to the great majority of inventors. The application of Mr. Smith in regard to the new publication entitled "The Inventor, Patentee, and Manufacturer," was disposed of by expressions of goodwill, and setting forth that the SCIENTIFIC REVIEW being the journal of the Institute, connection with any other journal would be inapplicable to the requirements of the case. With the financial statement, as usual, the meeting ended.

On the 25th January, the Executive Council met, and confirmed the minutes of the last meeting. No other business was transacted, as two important papers were to be read at the Members Meeting, and the preliminary conference, with the reading of the papers, fully occupied the time.

MEMBERS' MEETINGS.—On the 11th January, Mr. HOUGH, being unable to read his paper, the whole time was devoted to the Patent Law Conference, which fully endorsed the views of the Executive Council on Patent Law Reform.

On 25th January, Sir ANTONIO BRADY, President of the Institute, in the Chair:

Mr. HOUGH'S paper, "On Raising Sunken Vessels," was read, which stated his system to be arrangements for pumping compressed air into a sunken vessel, all holes and openings in such vessel being first stopped.

Mr. NICHOLLS paper, "On Preventing Collisions at Sea by Helm Indicating Signals," was also read. This was stated to be a system of arrangements of chains, rods, &c., connected with the helm, so disposed as to operate on signals (coloured lights for night and other suitable arrangements for the day time), these signals showing at once to a vessel coming in an opposite direction the position in which the helm was put by the steerer. A very full discussion took place, in which Admiral Selwyn, V.P., and other gentlemen took part, the two papers receiving general approbation, but we have to defer a full notice of them.

Monthly Notices.

Two new Explosive Compounds.—Lignose, invented by M. Falkenstein, is the name of a new blasting agent, and is made of woody fibre prepared with nitro-glycerine. It is stated to have about three times the force of block blasting powder, but is very irregular in its action, and is very sensitive to moisture. Pantopollet is produced at a dynamite manufactory at Opladen, on the Rhine, and consists of napthaline dissolved in nitroglycerine. The blasting action is quite good, and the force equal to about three times that of ordinary blasting powder. It yielded, however, during the experiments a very unpleasant smoke and odour, and produced severe pains in the heads and chests of the workmen.

Dr. C. W. Siemens' Artificial Production of Eyes.—This scientific curiosity is based upon the action of light upon the electric conductivity of selenium. A hollow sphere, suitably supported, is provided with two openings, in one of which is placed a converging lens, and in the other a selenium plate, the latter in communication with an electric current and a galvanometer. The lens being covered with two movable screens, the whole is comparable to an eye, in which the screens represent the lids, and the selenium plate the retina. Whenever the screens are removed, the galvanometer is seen to deviate and the degree of deviation depends on the colour of the light which converges upon the selenium. It is very slight if the light is blue, more if the light is red, and still more if white light be transmitted. The eye may be placed in communication with an electro-magnet, which may automatically operate the screens, in manner similar to lids. "Thus," in the words of Dr. Siemens, "we have an artificial eye, sensible to light and to differences in colour, which gives signs of fatigue when it is submitted to the prolonged action of light, which regains its strength after resting with closed lids," and which, by an electro-magnet attachment, may be made to close itself, as does the human eye involuntarily, on the occurrence of a vivid flash.

Trade Marks in America.—The Scientific American states the Hon. R. H. Duell, Commissioner of Patents, has received a communication from the Commissioner of Patents of Great Britain, informing him that by Act of Parliament foreigners have been accorded the privilege of registering trade marks in that country on the same terms as British subjects. The United States Patent Office has recently declined to register trade marks for British subjects for the reason that no provision had been made by treaty or Act of Parliament extending the reciprocal privilege to our citizens; but in view of the action of England now communicated, our Patent Office will hereafter register trade marks for them on the same terms and under the same regulations as those prescribed by it, in accordance with Act of Congress for citizens of this country. The letter from the London Patent Office calls especial attention to the fact that prior registration in the country of which a foreign trade mark owner is a subject is not necessary before registration in Great Britain; but in case a trade mark has been used before the date of enactment of the law (which date is not, however, stated in this communication) it will be necessary in the application for registry that a description of the goods in respect of which it has been used, and the length of time during which it has been so used, be given.

A New Blowpipe.—This blowpipe consists of a fire chamber, connected with an air-forcing apparatus, and provided with nozzles of various forms for directing one or more jets of heat and flame. The fire chamber consists of a cylinder of iron, having conical ends. To one of these ends the blast pipe is attached; and to the other a nozzle is attached by screws, so that it may be removed and replaced by nozzles of different forms. There is an aperture in the top of the fire chamber for the introduction of coal, &c. The chamber is lined with a coating of fire clay. It has a flat or elliptical nozzle, and a double nozzle is provided capable of directing the flame on both sides of an object. In use, the chamber is filled with burning charcoal, coke, or other suitable combustible substance, and the blast pipe is connected by a flexible pipe with a blower or bellows. A blast being created, a jet of flame and heated gases issues from the nozzle, which is directed against the object to be operated on. The heat generated in this manner is said to be so intense that heavy irons, like the frame or braces of a locomotive or other large objects, may be heated in their places and bent. With a nozzle having several jets arranged in an arc, the tire of a locomotive wheel may be heated and expanded, so that it may be easily removed. The apparatus is the invention of Messrs. O. G. Dodge and Wm. Gushurst, of Omaha, U.S.

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FEBRUARY 1, 1877.

STIFLING PATENT LAW REFORM.

THE SOCIETY OF ARTS SCHEME.

WITH feelings of no little regret do we give a permanent position to an *exposé* of a scheme put forward in the name of the Society of Arts, which, although placed before the public as one of Patent Law Reform, will at once be acknowledged as in reality an anti-Patent Law proposal by all who give the subject careful consideration. We cannot believe that the promoters of this scheme or those persons they have induced to sign the petition to the Lord Chancellor for the better organization of the Government Patent Office (a copy of which appeared in our last month's issue) can really understand the effect that must follow compliance with the prayer of that petition.

The petition referred to, after stating *very truly* that the Patent Law Amendment Act, 1852, has never yet been fully and properly worked, and, as they assert, because of non-compliance with the provisions of that Act in respect of the non-placement on the Patents for Inventions Commission, of some suitable persons other than the present *ex officio* Commissioners —to name them : the Lord Chancellor, Master of the Rolls, and Her Majesty's Law Officers for England, Scotland, and Ireland, who, having plenty of other important public work to do, can have very little time for the kind of work which it is desirable that Commissioners of Patents should perform. With the view to remedy this, the Council of the Society of Arts has already presented to the Lord Chancellor a petition, asking that such new "additional" Commissioners be appointed, "*duly paid*, and made responsible for the effective working of the law as it at present *exists*" (an ominous phrase, considering that the governing body of the Society of Arts is said to have as many *Anti*-Patent Law as Pro-Patent Law members belonging to it), adding that if this be done, "many of the objections now made, if not all, would be got rid of without any further legislation, at all events, for the present." And the petition expressly prays that "*no further legislation be attempted until such Commissioners shall have been appointed* and the system contemplated by the Act administered in its integrity," all which ignores the cardinal point of Patent Law Reform—*reduction of the Stamp Duties on Patents.*

We confess that, notwithstanding the resolutions that have been passed by the Inventors' Institute in regard to Americanizing our Patent System, by introducing the action of Examiners into it, we have never been fully convinced that all the good that is obtained by the Examination process (which, if adopted here, would be *vastly more expensive*, and probably not nearly so satisfactorily worked, as it is in America) could be obtained without any objectionable results; if the present Patent Laws were worked to the best advantage, as, for instance, by such a system as Mr. F. W. Campin long ago proposed—that the Patent Office Library and publication system should be so worked that patents arranged in classes should be published in reliable abridgements, *i.e.*, Steam Engines, Railways, India Rubber, Electricity, and so forth, which should be kept up by yearly supplements when the increase in the class is not sufficient to justify the issue of a new edition (to be followed by a new edition as soon as the increase be sufficient); and by requiring all applicants for Patents to make searches for any antecedent Patents, which they would be well able to do when they had such abridgments to consult; also the establishments of regulations as to oppositions to the grant of Patents, so that every application for a patent that ought to be opposed may be; all which, as Mr. Campin asserts, could be carried out under the Patent Law Amendment Act, 1852, without any Parliamentary action. But, even supposing all this to be effected, there remains the question of how to make the Patent Law available for the benefit of the *great majority of inventors, working men*, and others of small pecuniary means, which is the same as saying that a *large reduction in the cost of Patents is required.* This the Society of Arts in its Petition ignores, and more than this, as we are informed, *its Council refuses* to entertain overtures from the Inventors' Institute as to making this an addendum to their programme of Patent Law Reform.

Now any plan of so-called Patent Law Reform that does not include Reduction of the Stamp Duties on Patents is really a mere delusion, for supposing a system the most perfect in the world be devised, yet, if it be obtainable only upon payment of large sums of money, how is it to be of any use to the great body of inventors, who are, in fact, not in a position to pay such sums? In truth, unless the Reduction of the Stamp Duties on Patents be made the principal feature of any amendment of the Patent Laws, it will be just like the play of "Hamlet" with the part of Hamlet cut out.

The truth is the scheme of the Society of Arts, by falling short of what is required, induces us to object to it altogether, for we feel that just at the present moment its adoption would lead to the postponement of any real Patent Law Reform, which, as above stated, is no reform at all unless it includes Reduction of the Cost of Patents; for it will be said that the effect of the scheme requires to be tested by a few years trial, and, therefore, nothing ought to be done for some years to come.

Under these circumstances, we advise inventors and all interested to support the Inventors' Institute in the Movement for Reduction of Stamp Duties on Patents.

Proceedings of Societies.

ROYAL SOCIETY.

January 11th.—Dr. Hooker, C.B., President, in the chair.—The following papers were read:—"On some Phenomena connected with Vision," by Mr. B. T. Lowne,—and "Further Observations on the Locomotor System of Medusæ," by Mr. G. J. Romanes.

Jan. 18.—Dr. Hooker, President, in the chair.—The following papers were read: 'Note on the Changes of the Fixed Corpuscles of the Cornea in the Process of Inflammation,' by Mr. G. F. Dowdeswell, —'On the Residual Charge of the Leyden Jar:' II. 'Dielectric Properties of various Glasses,' by Dr. Hopkinson,—'Second Paper on the Forms assumed by Drops of Water falling Vertically on a Horizontal Plate,' by Mr. A. M. Worthington,—and 'Preliminary Note on the Development of Organisms in Organtic Infusions,' by Dr. Tyndall.

ZOOLOGICAL SOCIETY.

JANUARY 2ND.—Prof. Newton, V.P., in the chair.—The Secretary read a Report on the additions made to the menagerie during December. Prof. Newton exhibited and made remarks on a specimen of a variety of the Guillemot (*Alca troile*), with yellow bill and legs, lately shot on the south coast of England. Papers and communications were read: by Prof. Garrod, "On the Osteology and Visceral Anatomy of the Ruminantia," in which many facts concerning the anatomy of the Cervidæ and the Cavicornia were brought forward, especially with reference to the shape of the liver and the structure of the generative organs in these animals; among the most important of these was the observation that the uterine mucous membrane of the Musk Deer (*Moschus moschiferus*) presents no indications of the presence of cotyledons, the contrary being the case in all other Ruminants; Prof. Garrod likewise made a suggestion as to the proposed method of expressing the relations of species by means of formulæ,—by Messrs. Sclater and Saivin on eight new species of South American birds, namely, 1, *Euphonia Finschi*; 2, *Pheuticus crissalis*; 3, *Octhæca leucometopa*; 4, *Octhaca arenacea*; 5, *Chloronerpes dignus*; 6, *Celeus subflavus*; 7, *Chamæpelia Buckleyi*; 8. *Crax erythrognatha*,—by Mr. R. B. Sharpe, "On some New Species of Warblers from Madagascar," recently added to the collection in the British Museum, and proposed to be called *Apalis cerviniventris*, *Bæocerca flaviventris*, and *Dromæocerus brunneus*, the last named being a new genus, from Madagascar,—from Mr. G. S. Brady, "On Freshwater Mites," which had been obtained from lakes and ponds in England and Ireland.

January 16th.—Prof. Newton, V.P., in the chair.—Capt. H. W. Feilden, naturalist to the late Arctic Expedition, read a paper "On the Birds of the Northern Polar Basin," in which he described the ornithological results arrived at. Canon Tristram exhibited and made remarks on a specimen of a rare terrestrial dormouse (*Eliomys melanurus*), obtained by him in Southern Palestine. Mr. P. L Sclater exhibited and called attention to a collection of Mammals, Birds, Reptiles, Fishes, and Insects, which had been made by the Rev. G. Brown in Duke of York Island, and the neighbouring islands of New Britain and New Ireland. Prof. A. H. Garrod read a note on a variety of the Domestic Swine in the Society's collection, and pointed out that the presence of rudiments of a supplementary digit between the third and fourth digit might be the cause of the consolidation of the hoof observable in this variety. Communications were read from Mr. H. Durnford, "On the Habits of some small Mammals obtained in the Neighbourhood of Buenos Ayres;" from Mr. G. Krefft, "On a young living Cassowary (*Casuarius Australis*), from North Australia,' and destined for the Society's Collection; and from Mr G. F. Angas, "On a new Species of Helix, from South Australia," which he proposed to call *Helix* (*Rhagada*) *kooringensis*; from Mr. Angas, "On two Genera and twenty Species of Marine Shells, from different localities on the coast of New South Wales."

INSTITUTION OF CIVIL ENGINEERS.

DECEMBER 19TH.—*Annual Meeting.*—Mr. George Robert Stephenson, President, in the chair.—The proceedings commenced by the appointment of Scrutineers of the Ballot for Council, when, the ballot having first been declared open, the Report of the Council was read. The Constitution of the Society, which was alluded to in the two previous reports, had again received careful consideration. According to the present classification, no distinct provision was made for the large number of Engineers who were past the age when they could remain Students, but had not yet occupied such positions, nor been so employed, as to render them eligible for Members. This omission it was proposed, to supply by the creation of a class of *Associate Members*, the least objectionable title out of many that had been suggested. Simple as the matter might appear, the selection of a suitable expression for the new class had been difficult, as, for weighty reasons, it was deemed undesirable to disturb the existing title of Member and that of Associate. The proposed class was intended to embrace persons actually engaged in some of the branches of Civil Engineering, while in the future, Associates were to be restricted, as they originally were, to those "who are not Engineers by profession." The changes in the roll of the Institution during the past twelve months had led to an effective addition of 41 Members and of 137 Associates, bringing up the total number (exclusive of the Students) to 2,462, or an increase at the rate of nearly 8 per cent. per annum. Eleven years ago the gross total was 1,203, and in December, 1862, it was exactly 1,000. Into the class of Students attached to the Institution, 696 candidates had been admitted since it was established nine years ago. Of that number 385 were still on the books, 158 had been elected Associates, while the remaining 153 had ceased, from various causes, to be connected with the Society. As the scale of Contributions to the Funds had been unchanged for forty years, notwithstanding that in the interval all the circumstances had been so materially altered. it was open for serious consideration, whether the scale should not now be revised, and whether the time had not also arrived when the area for "Residents" should be made to include the whole of the United Kingdom, instead of being limited, as at present, to those living within ten miles of the General Post Office. There were twenty-six ordinary meetings during the past session, when nineteen papers were read and discussed. The character of the Original Communications, and of the remarks to which they gave rise, might be gathered from the printed records in the four volumes of "Minutes of Proceedings," already issued. Nine other papers had also been selected for publication in the second section of the Proceedings. To the Authors of fifteen out of these twenty-eight essays, Telford Medals and Premiums had been awarded. Of the recipients six were Members and six Associates of the Institution, while three did not belong to the Society, and one of these was a foreigner. A comparison of the earliest volumes of the "Minutes of Proceedings," first published in 1837, with the latest, showed that some progress had been made in the application of the exact sciences in designing works, so as to insure the greatest economy both of labour and of material; and it was in this direction, the combination of theory with practice, that the younger members of the profession must look to maintain their relative positions in the world. With a view of informing the members as to the state of Engineering on the Continent, in the United States, and in the Colonies, the Council had, during the last two years, caused an epitome of some of the most important Papers in foreign transactions and periodicals to be embodied in the Proceedings. These abstracts had included descriptions of works, studies of a purely theoretical nature, and memoirs and results of costly and elaborate experiments, the details of which were not to be found in any other English publication. In addition to the ordinary meetings there were fifteeen supplemental meetings for the reading and discussion of papers exclusively by students, nine of whom had been considered deserving of Miller Prizes. The Council had recently determined to print in the Proceedings any Papers by Students that contained such original information as to warrant their appearing in the publications. The property of the Institution comprised securities of the nominal value of £14,322 3s. 1d., held in trust for various purposes, of £22,494 1s. 8d., invested on the general account, and of a cash balance of £326 11s. 7d., together £37,142 16s. 4d., as against £35,297 15s. 8d. last year. Also, the stock in hand of the forty-six volumes of the "Minutes of Proceedings," numbering together about 7,000 volumes; the collections of original drawings and of portraits of Past-Presidents and other eminent engineers, to which a portrait of the late Mr. Joseph Miller had lately been added; and the Library, unrivalled and unique of its kind, now containing 13,431 volumes, being an increase of 3,000 volumes during the past three years. These effect were insured for £10,000. The statement of accounts showed receipts in the twelve months amounting to £11,181 17s. 7d., made up of three items, viz.:—To the credit of income, £8,844 10s. 4d., to that of trust funds, £459 19s. 3d., and to capital, £1,877 8s. The payments might be summarized under five heads, thus:—By house and establishment charges, £1,864 12s., salaries and wages, £2,419 3s., library, £605 4s. 3d., publications, "Minutes of Proceedings," £4,055 15s. 4d., and by premiums under trust, £313 7s. 8d., while £1,847 17s. 3d. had been invested, and the cash balance was, as before stated, £326 11s. 7d. Favourable as these results appear to be, they are not entirely so, as the liabilities to the printers and engravers, as well as to the several trust funds for unexpended dividends and to capital, were greater than at the same date last year. In fact, the expenditure now exceeded the income, though not the receipts, which comprised admissions and building-fund fees hitherto regarded as capital. The Report having been, after considerable discussion, adopted, the Premiums and Prizes (awarded at the close of last session, according to a list already circulated), were presented by the President, who congratulated the various recipients, in complimentary terms, upon the value of their contributions, especially the Hon. R. Clere Parsons, B.A., Student, who had gained a Miller Scholarship, the first that had been given, of £40 per annum, tenable for three years. A vote of thanks was then passed to the Council, for their unremitting attention to the affairs of the Corporation; and a similar vote to the President, for his zealous efforts to promote at all times the welfare of the Institution and of its members, was carried by acclamation. The ballot having been declared closed, the Scrutineers reported that the following gentlemen had been elected:—George Robert Stephenson, *President;* James Abernethy, Sir William George Armstrong, C.B., William Henry Barlow, and John Frederic Bateman, *Vice-*

Presidents; Sir Joseph William Bazalgette. C.B., I. Lowthian Bell, M.P., George Berkley, Frederick Joseph Bramwell, George Barclay Bruce, James Brunlees. Sir John Coode, Harrison Hayter, William Pole, C. William Siemens, Sir Joseph Whitworth, Bart., and Edward Woods, *Members;* and Col. George Chancellor Collyer, R.E., Henry Oakley and Col. John Thomas Smith, R.E., *Associates.* The meeting was then adjourned to Tuesday, the 16th of January, 1877, at 8 p.m., when the Monthly Ballot for members will take place.

January 16th.—Mr. G. R. Stephenson, President, in the chair.—The monthly ballot resulted in the election of sixteen candidates: Mr. C. F. Green as a member; and Messrs. H. V. Barclay, H. Blackbourn, W. H. Cobley, J. G. A. Creighton, T. H. Eagles, W. T. Foxlee, A. S. Gerrard, W. S. Henderson, E. J. Hunt, W. S. Lockhart, G. P. Mulock, C. S. Pain, W. Scott, W. A. Smith, and A. J. H. Smythe, as associates. The paper read was "On the Repairs and Renewals of Locomotives," by Mr. A. McDonnell.

SOCIETY OF ARTS.

Jan. 17.—Lord A. S. Churchill in the chair. Twenty-one new Members were proposed for election. The papers read were: "On the Cultivation of Common Fruits," by Mr. G. C. T. Bartley; and "On Railway Waste and Reclamation," by Mr. Hyde Clarke.

Jan. 23.—Sir T. F. Buxton in the chair.—The paper read was "On the Trade of Central Africa, Present and Future," by Commander Cameron.

Jan. 24.—Sir A. Brady in the chair.—Eight new Members were proposed for election.—The paper read was "On Silkworm Grain," by Mr. B. F. Cobb.

LINNEAN SOCIETY.

DECEMBER 21ST.—Prof. Allman, President, in the chair. Mr. T. Christy and Mr. R. Drane were elected Fellows. The description of two new and remarkable forms of Deep-sea Ascidians was given by Mr. H. N. Moseley of H.M.S. Challenger. One trawled in the North Pacific from 2.900 fathoms, cup-like, and allied to Boltenia, he names *Hybythius calcycodes.* It has a series of symmetrical cartilaginous plates on its soft test. The other ascidian, *Octacnemus bythius,* was obtained at 1,070 fathoms. This is star-shaped, and in several respects its anatomical structure is quite peculiar, and totally unlike already-known living forms. A commercial cane, termed "Whangee," a species of Phyllostachys, formed the subject of a note by Mr. J. R. Jackson. He regards that, in the trade, as the rhizome and not the stem; and the pale colour he thinks produced by bleaching. A second botanical paper, by Mr. M. Hartog, gave the results of some investigations on the Morphology of Species of Thunbergia. Microscopical sections of *T. laurifolia* in its earlier stages reveal axillary buds inside the sixth and eighth pair of bracts, the basal elevations becoming pedicel and bractlets, and inside these by repetition sister-buds arise. The flowers are thus auxillary buds, formed in succession from the axis outwards, and are as independent as if they had arisen side by side. A new Hornbill *(Craniorrhinus Waldeni),* from the island of Panay, Philippines, was described by Mr. R. B. Sharpe. It is allied to *C. cassidix,* and was shot in a dense forest in a mountainous range of the above island. In the extract of a letter, Dr. J. Anderson details some curious facts witnessed by him in the Calcutta Zoological Gardens. Two Hornbills, *Hydrocissa albirostris* and *Aceros subruficollis,* daily devour sparrows and other small birds; these they toss about in their bill, break every bone in their body, and then swallow head foremost. Mr. A. G. Butler gave an abstract of a memoir "On the Butterflies of Malacca." Of 258 species registered, 36 are endemic; of the remainder, 65 also belong to Assam or Nepal, 38 to Moulmein, 33 to Ceylon, 94 to Penang, 46 to Singapore, 112 to Borneo, 41 to Sumatra, 87 to Java, 39 to Siam, 26 to China, 2 to New Hebrides, and 6 to Australia. Thus this section of the Malaccan Fauna shows decided proclivities to the Indian geographical region. The small inner ear-bones (auditory ossicles) of the mammalia, Mr. A. Doran has worked out in detail. In the abstract of his memoir read at the meeting, certain groups only were referred to. These bones in the insectivora are deficient in positive characters: in the bats they approach those of the shrews, though Pteropus shows lower type; those of whales are of a generalized form; whilst the manatee group are peculiar both in their density and shape; armadillos, sloths, and ant-eaters, all coming under the Edentata, nevertheless show great distinctions among themselves, so far as their ear ossicles are concerned; the kangaroo and other pouched animals manifest a low grade; and the bones in the Echidna and Ornithorhynchus still descend as regards form, tending, as it were, to those of birds and reptiles. Mr. Doran's researches show that even in what may be considered minor particulars, characters indicative of alliance are revealed. *Actæmorpha erosa* is a new genus and species of Australian crustacean described by Mr. E. J. Miers. It closely resembles some of the Cancroidea, along with which it was dredged from seven fathoms; but structurally it belongs to the family Leucosiidæ. Dr. B. White brought forward a paper "On the Genital Armature in a Group of the European Lepidoptera (Rhopalocera)." The organs in question, according to him, present such varied characters as to induce him to regard these as of importance to entomologists in their classification, not only of larger groups, but even significant of specific and generic forms.

GEOGRAPHICAL SOCIETY.

JANUARY 8TH.—Sir R. Alcock, President, in the chair.—The following gentlemen were elected Fellows: Sir J. H. Kennaway, Bart., M.P., Rear-Admiral the Right Hon. Lord Gilford, Capt. H. C. Marsh, Dr. J. G. da Cunha, Messrs. E. Brass, H. R. Brown, T. H. Crane, I. Davis, W. C. Harvey, W. G. Horncastle, W. G. F. Hunt, G. Inverarity, F. G. Lewin, F. H. Lyell, J. S. O'Halloran, T. Parkin, C. B. Renshaw, E. C. Rogers, and G. Thorpe. The paper read was "On the Russian Expedition to the Alai and Pamir," by Mr. R. Michell.

Jan 22.—Sir R. Alcock, President, in the chair.—The following gentlemen were elected Fellows: Right Hon. Sir R. Couch, Sir J. J. T. Lawrence, Bart., Commander L. A. Beaumont, Commander R. P. Jenkins, Capt. C. Mackenzie, Capt. W. J. E. Poole, Lieut.-Col. G M. Payne. Lieut. C. A. Frere, Rev. J. Barton, Rev. G. De Vitre, Dr A. Goodall; Messrs. R. V. Barrow, G. Darbishire, J. M. S. Fogo, R. W. Galbraith, F. B. Halford, E. Hare, H. Lee, F. G. Luck, G. J. J. Mair, C. H. Marten, S. Mendel, E. S. Morris, W. I. Page, C. C. Pitcairn, O. M. Prowse, F. Sandeman, C. Seely, jun., E. L. T. Smith, R. A. Sterndale, W. E. M. Tomlinson, J. H. B. Warner, S. F. White, and H. F. R. Yorke.—The paper read was 'On later Explorations in the Interior of Madagascar,' by the Rev. J. Mullens, D.D.

CHEMICAL SOCIETY.

January 18th.—Prof. Odling, V.P., in the chair.—The Secretary read a paper by Dr. Jäger, "On some Derivatives of Dithymyltrichlorethane," a substance produced on adding a mixture of sulphuric and acetic acids to a mixture of thymol and chloral. By heating this compound with zinc dust it yields dithymylethane and dithymylethene. Mr. Kingzett read a preliminary notice by Dr. Hake and himself, "On some New Reactions in Organic Chemistry, and their Ultimate Bearings," showing that the colour reaction known as the "Pettenkofer reaction," produced by the action of sulphuric acid on sugar and cholic acid, extended to many other substances, some of which did not require the admixture of sugar to produce the colour. This was followed by a paper "On Dinitroso-orcin and Dinitro-orcin," by Dr. J. Stenhouse and Mr. C. E. Groves, in which the methods of preparation and properties of these compounds were fully described, and one by Mr. T. Carnelley, "On High Melting Points, with Special Reference to those of Metallic Salts, Part III."

ASTRONOMICAL SOCIETY.

January 12th.—W. Huggins, D.C.L., President. in the chair. Mr. R. J. Baillie, Mr. H. V. Barclay, the Rev. D. Dutton, Mr. S. Haywood, Dr. L. S. Little, Mr. R. Pearce, Commander W. J. L. Wharton, and Mr. J. Young were elected Fellows. A paper by Mr. Marth, giving an ephemeris for the satellites of Uranus for the year 1877, was read. This is one of a series of papers which Mr. Marth has presented to the Society, giving ephemerides useful for physical observations of the major planets and their satellites. It was remarked by the President that these ephemerides involved great labour in their construction, and the astronomical world is deeply indebted to Mr. Marth for their production. A paper, by Prof. Harkness, "On the Theory of the Horizontal Photoheliograph," was read. The instrument consists of a heliostat and a long-focussed object-glass, in the principal focus of which the negatives are taken. The distortion produced by secondary magnifiers is thus avoided, and very accurate means are adopted for determining the shrinkage of the collodion film upon the plate, and the accurate orientation of the photographs. Mr. W. Erck read a paper "On an Improved Eyepiece for Viewing the Sun." His method is to use a small glass prism as a reflector, which is placed within the image of the sun, so that only a portion of the rays from a part of the disc are reflected into the eyepiece at any one time. The effects of heating are thus reduced to a minimum; and for viewing small areas of the sun, the eyepiece is preferable to that suggested by Mr. Dawes, in which the light of the whole image is reflected, and the small area to be observed is viewed through a diaphragm which is exposed to the heating effects of the reflected rays. A paper by Mr. Knott was presented to the Society. It contains a catalogue which he has been some years in preparing, and gives a very large number of micrometrical measures of double stars, which have been made with an excellent eight-inch refracting telescope, formerly the property of Mr. Dawes.

PHYSICAL SOCIETY.

Jan. 20.—Prof. G. C. Foster, President. in the chair.—Mr. A. G. Greenhill was elected a Member. Dr. Huggins exhibited an enlarged view of a photograph of the Spectrum of the Star *a* Lyræ, which he has recently taken in a manner similar to that in which the Spectrum of Syrius has already been obtained. Mr. W. C. Roberts read a paper "On the Artificial Production of Columnar Structure." He found as the result of experiment, that when certain masses of clay and sand are heated to about 1300° C., they contract to about the same amount as a basalt does in passing from the molten to the solid state, and that beautiful columnar forms are produced. He had hoped, by accumulating a number of specimens, to have been able to establish a relation between the strains at the point of rupture and the dimensions of the hexagons; but in the small masses employed the strains were so numerous that it was impossible to apportion their influences. Prof. Guthrie showed an arrangement he has recently devised in the hope of making the mercurial as sensative as the water barometer.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

JANUARY 3RD.—H. Syer Cuming, Esq., in the chair.—Several fragments of the Roman pavement discovered in 1875 opposite Crosby Hall were exhibited by Mr. R. E. Way. The pavement was hardly noticed at the period of its discovery, owing to the rapidity with which it was either covered up or destroyed. It had tesseræ of red and white, and it most probably formed a part of the large Roman villa of which much of the foundations (well-known) was met with several years ago in Old Broad-street. Mr. Way also exhibited sundry other objects of interest, including some sling stones from Sidbury Castle, near Sidmouth. The Rev. C. Boutell presented to the Association and described a capital series of photographs of the Misereres of the old stalls of Worcester Cathedral, executed probably between the years 1375 and 1400. They were removed in 1551, and have recently been restored by Mr. Perkins and replaced in the choir, but their exact arrangement has been lost. Mr. L. Brock read a communication from the Rev. Prebendary Scarth, reporting the discovery of two Roman pigs of lead among the *débris* of mining works at Charterhouse, on the Mendip Hills, and bearing the name of Vespasian. Mr. W. Money announced the discovery of an ancient chimney-piece, of fifteenth-century workmanship, in clearing away the site for the municipal buildings at Newbury, and a drawing was exhibited. The Rev. S. M. Mayhew exhibited several interesting fictile vessels—a costrel with three loops, a Roman vessel to which a snail still adhered, and a fragment of figured pottery, made probably in the Rhine Provinces, in imitation of Arezzo ware. The interest, however, centred in an ancient fragment of a vessel with Chinese characters found with the Roman relics, and affording evidence of the extent of Roman commerce. Mrs. Baily sent a curious Italian water-bottle, of seventeenth-century work, in the form of a melon. The first paper read was by Mr. C. Lyman, descriptive of the ancient crosses of Staffordshire, and illustrated by a large collection of drawings and casts. These represented several of Saxon date, and the similarity to those of Ireland, Wales, Scotland, and Cornwall was pointed out. The second paper was by Mr. C. W. Dymond, "On Megalithic Antiquities of Stanton-on-Drew;" and the Chairman read some notes descriptive of several little known Roman effigies in the churches of Norfolk, and which are of considerable interest.

Jan. 17th.—Mr. T. Morgan in the chair.—Mr. Roach Smith reported that a large portion of the walls of Britford Church, Wilts, were those of a Roman building. Mr. Way exhibited a series of relics from Pompeii. Mr. W. Money sent a collection of small wig-curling implements found at Newbury, near the head-quarters of Charles the First during the civil wars. Mr. L. Brock exhibited a large series of paving-tiles, of mediæval date, from the site of the demolished church of St. Antholin, City; and Capt. Joseph two more from the same place, one bearing the date 1591, on a white ground. Mr. W. de Grey Birch exhibited and described two interesting historical rolls on parchment, belonging to Mr. Halsey, M.P., of Great Gaddesden. One, which was fully twenty-five feet long, was written in the time of Edward the Third; but its records, which commenced with Adam, and which were principally in similar terms to those of Geoffrey of Monmouth, Wace, and other old chroniclers, ended with a record of the children of Henry the Third. The second roll was written in English verse, and had portraits of the kings of England. It commenced with William the First, and ended with Henry the Sixth, in whose reign most probably it was written. Mr. S. Tucker, Rouge Croix, described a similar roll in the Heralds' College. Some further evidence was rendered confirmatory of the Chinese relic found with Roman remains in London, and described at the last meeting. Mr. Blashell exhibited a remarkable bronze ring of fifteenth-century work from the church of Dormington, Hereford. Mr. C. Brent described a rare knife of Saxon date, found, with its leathern sheath, in the Thames. The first paper was by Mr. W. F. Grover, "On the Suez Canal." The lecturer described the various efforts made in ancient times to form a communication from the Mediterranean on one side to the Red Sea on the other. The concluding paper was by Mr. Syer Cuming, "On the Peculiar Stoneware manufactured at Sieburg, near Cologne, at the latter end of the fifteenth and during the whole of the sixteenth Century." This ware is not unfrequently found in London, and several specimens were exhibited.

NUMISMATIC SOCIETY.

JANUARY 18TH.—J. Evans, Esq., President, in the chair.—The following gentlemen were elected members:—Messrs. G. D. Brown, F. G. Lawrence, J. Lord, and M. C. Sykes. Mr. Evans exhibited an aureus of the Emperor Trajan, with, on the reverse, DIVVS PATER TRAIANVS, and a portrait of the father of the Emperor. Mr. Pearson exhibited a third brass coin of Constantius II.: *obv.*, his bust to the left in paludamentum; *rev.*, CONSTANTIVS CAESAR SMNE. Mr. B. V. Head read a paper, by M. J. P. Six, of Amsterdam, "On the Series of Silver Staters having on the *obv.* the Great King as a kneeling Archer, and on the *rev.* a Persian Satrap on Horseback, galloping to the Right." These M. Six attributed to the district of Caria. The writer was further of opinion that the majority of them were issued in the reigns of the dynasts Pixodarus and Othontopates. A discussion followed, in the course of which Mr. Gardner said that the attribution of these coins to the satraps of Caria was, at first sight, strikingly at variance with the recognized canons of the science of numismatics, and that if it were adopted numismatists would be, in fact, admitting that two distinct currencies, the one purely Greek and the other Persian, were issued simultaneously by the Carian dynasts. Mr. Head was of opinion that the fact of the coins in question having been found, mingled with Carian coins, in the island of Calymna, coupled with the Rhodian standard of weight, according to which they were adjusted, induced him to lean towards M. Six's hypothesis, although not accepting it in all its details. Mr. Cochran-Patrick communicated the first part of a paper "On the Medallic History of Scotland."

MICROSCOPICAL SOCIETY.

JANUARY 3RD.—C. Brooke, Esq., V.P., in the chair.—A list of donations to the Society was read and acknowledged, and four new Fellows were elected. Mr. Jackson and Mr. Gay were elected Auditors, and nominations of gentlemen as Officers and Council—to be elected at the ensuing Annual Meeting—took place. Dr. Wallich read a paper "On the Development, Reproduction and Surface Markings of Diatoms," illustrating the subject by drawings. A paper was read by Mr. J. W. Stephenson, descriptive of some curious diffraction experiments, exhibited by Prof. Albe during a recent visit to this country, by which it appeared that the use of "diffraction gratings," in connection with stops of various kinds placed above the back combination of the objective, were competent to produce precisely the same appearances as were observed in certain well-known test-objects. The paper was illustrated by coloured drawings, and gave rise to a discussion, in which Dr. Wallich, Mr. Ingpen, Dr. Lettsom, and Mr. Stephenson took part. Some mercury globules, mounted in balsam, were exhibited under the micro-polariscope by Mr. Stephenson for Mr. Slack, producing some very curious and interesting optical effects.

ANTHROPOLOGICAL INSTITUTE.

JANUARY 9TH.—Col. A. Lane Fox, President, in the chair.—Mr. Moseley, naturalist to the Challenger Expedition, read an account of the inhabitants of the Admiralty Islands. He considered that in their arts, as shown in the ornamentation of their weapons, &c., they resembled the natives of New Guinea, while in a peculiar note in their chants or singing he noticed a strong Fijian resemblance. Their manner of hafting the stone implements differed from that in other groups, the stone being fixed in a slot in the wood. Obsidian spear and knife heads were shown, the mounting of the Obsidian flakes in the spear-heads being effected with a strong gum and twine. The lecturer described the customs, dress, and manners of the natives, and gave some thirty-five words of the language. The whole was illustrated with maps, sketches, and numerous objects. The President and Prof. Rolleston took part in the discussion. Mr. J. P. Harrison read the Report on recent excavations at Cissbury Camp, which was followed by a discussion, in which the President, Prof. Rolleston, and Canon Greenwell took part.

MATHEMATICAL SOCIETY.

Jan. 11.—S. Roberts, Esq., Treasurer, in the chair. Mr. G. W. Von Tunzelmann was elected a Member. The following communications were made: "Determined Conditions for Curves, or Surfaces, of the same Order, having all their Intersections Common," by Mr. J. Hammond; "Numerical Values of the First Twelve Powers of π, of their Reciprocals, and of certain other Related Quantities," by Mr. J. W. L. Glaisher; "On some General Classes of Multiple Definite Integrals," by Mr. E. B. Elliott; "On the Partial Differential Equation, $s+Pp+Qq+Z=0$," by Prof. H. W. Tanner; "Determination of the Axes of a Conic in Trilinear Co-ordinates," by Mr. J. J. Walker; and "On some Elliptic Function Properties," by Prof. H. J. S. Smith, F.R.S.

GEOLOGICAL SOCIETY.

DECEMBER 20TH.—Prof. P. M. Duncan, President, in the chair.—Messrs. B. P. Bidder, R. W. Cheadle, D. Grieve, P. Isaac, J. Love, K. Nicholls, W. Ridley, W. J. Spratling, and G. B. Walker, were elected Fellows. The following communications were read: "On *Pharetrospongia Strahani*, a Fossil Holorhaphidote Sponge from the Cambridge Coprolite Bed," by Mr. W. J. Sollas,—"On the Remains of a large Crustacean, probably indicative of a new Species of Eurypterus, or allied Genus *(Eurypterus? Stevensoni)* from the Lower Carboniferious Series (Cement-stone Group) of Berwickshire," by Mr. Robert Etheride, jun.,—"On the Silurian Grits near Corwen, North Wales," by Prof. T. M'Kenny Hughes,—and "On Mineral Veins," by Mr. W. Morgan.

January 10th.—Prof. P. M. Duncan, President, in the chair.—Messrs. F. Tendron and D. Thomas were elected fellows; and Dr. J. F. Brandt, of St. Petersburg, Dr. C. W. Gumbel, of Munich, and Prof. E. Suess, of Vienna, foreign members.—The papers read were, "On Gigantic Land-Tortoises and a small Freshwater Species from the Ossiferous Caverns of Malta, together with a list of the Fossil Fauna and a Note on Chelonian Remains from the Rock-cavities of Gibraltar," by Mr. A. L. Adams,—and "On the Corallian Rocks of England," by the Rev. J. F. Blake. A special general meeting was held, at which Mr. R. Etheridge was elected vice-president, in the room of Mr. J. W. Hulke.

METEOROLOGICAL SOCIETY.

DECEMBER 20TH.—Mr. H. S. Eaton, President, in the chair.—The Rev. C. C. Chevallier, T. Gordon, and the Rev. T. H. Quelch, were elected Fellows. The following papers were read: "On Observations with the Psychrometer," by Dr. R. Rubenson. This paper contains an account of the instructions issued to the Swedish observers in order to obtain trustworthy results from the psychrometer, or dry and wet bulb hygrometer. These instructions, however, do not differ from those followed by English observers at the present time. "Contributions to Hygrometry: the Wet Bulb Thermometer," by Mr. W. Marriott. This paper contains the results of observations made with several wet bulbs in different positions, and under different conditions, which were carried on in order to determine what a wet bulb thermometer should be. Ten thermometers were used as wet bulbs, and three as dry bulbs. With three wet bulbs the water receptacles were placed at different angles, but it was found that the readings were not affected by the position of the water receptacle; others were used with different thicknesses of muslin and conducting threads, but it was shown that the thermometers with the thinnest muslins always gave the lowest readings. Three pairs of dry and wet bulbs were used, one with a closed water reservoir six inches from the dry bulb, the other two having open reservoirs, which were respectively three inches and one inch from the dry bulbs. It was found that the dry bulbs of the two latter read lower than the former in fine, dry weather, but when the air was damp and during rain they generally read higher. The wet bulbs of the latter read a little higher than the former; this was mostly the case in damp weather. In conclusion, the author submitted for adoption certain regulations for the management of the dry and wet bulb thermometers in order to secure comparable results. "Visibility," by the Hon. R. Abercromby. Visibility, or unusual clearness and nearness of distant objects, is a very trustworthy prognostic of rain in this and many other countries. The usual explanation that much moisture increases the transparency of the atmosphere is not borne out by observation. In this country great nearness occurs on a clear, brisk day, when hard masses of cloud shade the glare of the sky from crossing direct light sent from distant objects, and make clearness so great as to give the impression of nearness. The kind of rain which immediately follows nearness is in short, sharp showers, but unsettled weather often follows later. The synoptic conditions of nearness in this country are either straight isobars, or the edge of anticyclones, neither of which are associated with settled weather. "Description of a Meteorographic Model," a letter from the late Commodore M. F. Maury to Capt. H. Toynbee.

January 17th.—*Annual General Meeting.*—Mr. H. S. Eaton, M.A., President, in the chair.—The Council in their Report expressed their satisfaction at the progress that had been made by the Society during the year. The first point on which they thought there was reason for congratulation was the publication in their *Journal* of the daily observations taken at Hawes and Strathfield Turgiss, and of the monthly abstracts of the observations at thirteen other stations. They also referred, with much satisfaction, to the enlargement of the *Quarterly Journal*, as well as to the printing of the Catalogue of the Library and of the List of Fellows, which have both been issued during the year. They drew special attention to the Report of Mr. Symons on the new stations which have been inspected and brought into relation with the Society. The financial position, notwithstanding the large outlays during the year, was good. The Report also contained the interesting discussion by the Rev. T. A. Preston, M.A., of the observations on Natural Periodical Phenomena. The following gentlemen were elected Officers and Council for the ensuing year:—President, H. S. Eaton, M.A.; Vice-Presidents, J. P. Harrison, M.A., J. K. Laughton, M.A., Dr. R. J. Mann, and C. V. Walker; Treasurer, H. Perigal; Trustees, Sir Antonio Brady and S. W. Silver; Secretaries, G. J. Symons and Dr. J. W. Tripe; Foreign Secretary, R. H. Scott, M.A.; Council, P. Bicknell, A. Brewin, C. Brooke, M.A., E. E. Dymond, J. Evans, R. Field, C. Greaves, W. C. Nash, Rev. T. A. Preston, M.A., W. Sowerby, Capt. H. Toynbee, and G. M. Whipple.

STATISTICAL SOCIETY.

January 16th.—J. Heywood, Esq., President, in the chair.—The paper read was, "On some Statistics of the Affiliated Orders of Friendly Societies (Odd Fellows and Foresters)," by Mr. F. G. P. Neison. A discussion ensued, in which the President, Messrs. Lumley, Walford, R. P. Hardy, Dr. Balfour, Sir G. Young, and others took part.

PSYCHOLOGICAL SOCIETY.

Jan. 18.—Mr. Serjeant Cox, President, in the chair.—Miss Barrett was elected a Member.—Communications were read of psychological facts and phenomena.—Prof. Plumptre read a paper "On the Psychology of the Human Voice." A discussion followed that lasted the whole evening.

ASIATIC SOCIETY.

Jan. 15.—Sir E. Colebrooke, Bart., M.P., President, in the chair.—Sir W. Muir was elected a Member.—A paper was read, contributed by Mr. H. H. Howorth, 'On the Northern Frontagers of China, the Kin or Golden Tatars,' in which the writer gave a very full and interesting account of the gradual rise and progress of this tribe, the Yuchis, and of the circumstances which led to their successful conquest and occupation of the northern part of China (during the eleventh century A.D.), which was then under the feeble rule of the Khitan or Liau dynasty. Sketches of the lives of many of the Yuchi chiefs were given, with a more enlarged biography of Aguta, who raised his people from being a petty kingdom in Manchuria to an important position among the northen Asiatic powers. Aguta died A.D. 1123, at the age of fifty-five years, leaving, as the results of his prowess, an empire, the capital of which was, shortly afterwards, the present Pekin.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

Jan. 2.—S. Birch, LL.D., D.C.L., President, in the chair. This being the seventh Anniversary Meeting of the Society, the usual Report for the past year 1875-6 was read for the Secretary by Mr. Arthur Cates. The increase of Members during the past year had been sixty-three. Dr. Birch was unanimously re-elected President; Mr. Bosanquet, Treasurer; Messrs. W. R. Cooper and A. Cates were appointed Secretaries. The following paper was read, "The Mammalia of the Assyrian Sculptures (Part II. Wild Mammalia)," by the Rev. William Houghton, M.A., F.L.S.

PHILOLOGICAL SOCIETY.

January 19th.—H. Sweet, Esq., President, in the chair.—Dr Weymouth read a paper 'On *Here* and *There* in Chaucer.' The first point contended for was that *e* has two sounds in Chaucer, and that *here* and *there* are representatives of two classes of words which, though spelt alike, refuse to rhyme. The number of rhymes in all Chaucer formed by words ending in *-er* or *-ere* (with other varieties of spelling) is 1,246, and examination of these proves that certain words, of which *here* is one, habitually rhyme with one another; and that certain others, *there*, *where*, &c., also habitually rhyme with one another; but these latter only very exceptionally rhyme with the former class. To give a single instance: the adjective *dere* (dear) forms in all 251 rhymes in Chaucer, in only three of which does it rhyme with a word of the *there* class. In Robert of Gloucester, Lyndesay, and other early poets, a like distinction of the two classes of *-ere* words is clearly marked. The sound of *there* not being disputed, it remains to show how *here* was pronounced, and the three following propositions were maintained: 1. There is direct evidence that the vowel in *here* was sounded as *ee* in modern English. This is proved by the traditional English pronunciation of the words; by the authority of Sir Thomas Smith, the orthoepist, who, writing in 1568, distinctly opposes the *e Anglicum* to the *e Italicum;* by the orthography and traditional pronunciation of *here* and the noun *deer* (which everywhere rhymes with the *here* class) in all the Teutonic dialects; and by other arguments. 2. There is evidence to show that the symbol to which Mr. A. J. Ellis (whose views Dr. Weymouth opposes) attaches this sound of *ee* in fourteenth century English, namely *i*, was not sounded *ee* but nearly or quite as we still sound it in *my wife*. This was argued partly from the traditional pronunciation of words of this class, but mainly from the statements of the grammarians of the sixteenth century, and the entire absence of evidence that any change had taken place between the fourteenth century and the sixteenth. 3. That the *e* in *here* was not simply the *e ferme*, that sound being represented by *ai*, *ay*, *ei*, *ey*. This was argued from English and French tradition in *veine*, *plaine*, &c.; from Icelandic tradition in *sweyn*, and one or two other words; from the frequent interchange of *e* with *ai* in early French orthography; from early French rhymes; and from the statements of the grammarians. It was also urged that some of the difficulties which their statements present may be removed by remembering the differences of the dialects which Gil and Smith represented as opposed to Chaucer, who was a Londoner.

CENTENNIAL NOTES.

We extract the following interesting remarks on the Centennial Exhibition, from the *Scientific American*:—

THE FRENCH WOODWORKING MACHINERY was an admirable display, principally from the works of M. F. Arbey, of Paris. Three machines, which won awards from the judges, are novel in construction. One of these is a planer with helical knives and a permanent sharpening apparatus. The spiral cutters present many advantages over the straight knives, always cutting equally and making the operation of cutting continuous. Very thin knife blades are used, so that but a short time is taken to sharpen them, and this is done with the utmost accuracy by an emery wheel, permanently attached to the machine, which has only to be set and then allowed to run, when it does the work automatically. A stave-cutting machine is exhibited, in which the revolving circular saw (which cuts the stave of any desired lateral curve and of any bevel) is brought up to the stave, instead of the stave being carried to the saw. It is constructed for the special purpose of economy in the use of wood. A lathe for copying sword handles and other small articles of irregular shape is also an ingenious machine. A feeler follows the original, as in a carving machine or pantagraph, and reproduces it by the cutter, which is set in the relative planes over the stocks to be turned or carved. A lathe for turning the legs of tables, &c., also exhibited, does excellent work, and cuts a spiral groove down the body of the leg. All the exhibited machines are marked by beauty of form and solidity, and, in ingenuity of combination, more nearly resemble American machinery (though different therefrom) than any others of foreign production.

The French Motors.

The Gramme electric machine was used for driving an electric engine, which was exhibited pumping water, being connected with a pump by belting. It has no connection with other machinery, except the copper wire leading to the generator of electricity. As in this double conversion of power into electricity and electricity into power, less power is obtained than is expended, the machine is apparently of no practical value, but is interesting as showing the relations existing between power and electricity.

Mignon and Ronart, Paris, exhibit a domestic motor, which is a steam engine with vertical tubular boiler of novel construction. Steam is generated by a gas flame, automatically regulated according to the requirements of the engine.

Bischot's gas machine reminds one of the German gas machines, which attract considerable attention by their explosions of a mixture of gas and air. The explosion drives up a piston, the descent of which by gravity furnishes the motive power, and prepares the way for a new explosion. Bischof's machine appears to be made on the same principle, and is of one and a half horse power. These machines are made from 1-100th horse power to 100 horse power. They are said to be noiseless, an advantage which cannot be claimed for the German engines.

Another interesting French exhibit was the novel

Soap and Candle Making Machinery.

The blocks of rough soap to be made into toilet soap are first cut into thin shavings in a planing machine, and the shavings are then ground with colouring matter, essential oil, and scents, until they form a homogeneous paste. The machine for grinding contains granite cylinders, which pass the paste automatically between them, and finally into the upper portion of the hopper, so that the services of only one attendant are required for several machines. After the paste has been ground, it passes to a machine called the peloteuse, or mixing mill, which stretches and draws it out and prepares it for being moulded and stamped. The peloteuse does instantly what at one time required several weeks of scraping, washing, and drying. It is a mortar, in which the soap paste is packed until it is freed of air, and from which it is then forced by increase of pressure, passing through draw plates of any required cross section. A self-acting cutter divides the stream of soap into blocks of any desired size or weight, just as cutters on brick machines divide the continuous streams of clay into bricks. The blocks of soap are then taken to a press, which shapes or moulds them, and impresses on them the name of the maker. In the candle-making process, a double hot press, with iron cylinder and forty hollow plates produces from 150 to 165 pounds of stearin in twenty minutes—the time necessary for pressure to be applied. A double horizontal cold press contains 175 loaves, and may be loaded, operated, and unloaded in an hour and a half.

A Novel Safety Apparatus for Boilers

consists first of a combination of safety valve and of a float, which, under certain conditions of pressure or water level, acts upon the second part of the apparatus, which is a damper in the draft flue. When the limit of calculated pressure is reached, the clapper rises, the steam fills the apparatus, the whistle sounds, and the piston goes down, carrying with it the damper, which closes the flue. When the pressure has fallen, a counterpoise re-opens the damper. When the water falls below a determined level, the float raises the valve, and the same results follow.

The French Engineering Exhibits

offered abundant material for study. M. de Lesseps' proposed system of ascending Mont Blanc by railway was shown in a sectional drawing of the mountain side and the engineering works. The cars under this system would be run for a short distance on a level, then raised by hydraulic pressure to a new level, and run a short distance to a new station, from which they would be again lifted, and so on, until, ascending the mountain by forty-nine such lifts, they reached the top. The plan, in other words, proposes the building of a series of platforms or steps, up which the cars should be lifted by hydraulic pressure. With the display of patterns of steel rails, used on French railways, are given the details of experiments upon iron rails, which showed that those of the best quality did not resist the wear and tear of a traffic of twenty millions of tons, while those of ordinary quality succumbed to a circulation of fourteen millions. With regard to steel rails, all the trials show that the flange wears in a uniform proportion of 0·039in. of thickness for a traffic of twenty millions of tons; and as they are constructed for a wear of 0·39in., it may be calculated that the duration of the steel rails will correspond to a traffic of at least two hundred millions of tons, that is, that they will last ten times as long as the best rails in wrought iron. The weight of the rail, if of steel, can be reduced so as to bring the cost of steel rails to about that of wrought iron rails, and considerations like these have led to the general introduction of steel rails on the French railroads. Drawings of the elevating machines for the water supply of the canal from the Aisne to the Marne were also exhibited. This canal establishes water communication between the metal mines of Saint Dizier and the coal mines of the north of Belgium. It passes through a permeable stratum of white chalk formation, and there is no adequate supply of water at a convenient level. The water must, therefore, be raised from the Marne by the aid of powerful machinery. Five turbines placed in a line, and about 30ft. apart, are used. The three central ones work vertical double-action pumps, and one system is connected with another by coupling gear joining the crank pins. The turbines at either end serve as a reinforcement, taking their share of the work only when the crank is put in gear with the adjacent system. The mechanical product in water raised, that is, the relation between the actual work done by the system and the gross power furnished by the fall, amounts to 0·67, and the cost of delivering 32,700 cubic feet of water at the summit level was calculated in 1871 at about 20 cents.

The French Art Enamels

embody several wonderful copies of paintings by the ancient masters. The metals used to enamel on are gold, silver, and copper; and the enamels or vitrifiable paints, with which the metal is covered and decorated, are peculiar preparations of glass to which metallic oxides impart the required colours. In general, three parts of lead and three parts of tin are oxydized by continual heat and exposure to the air. To the mixed oxides thus obtained are added ten parts of powdered quartz or flint, and two parts of common salt. The whole is then melted in a crucible together, and produces white enamel and the basis of coloured enamel, which latter is made by the addition to the white enamel of other metallic oxides. Yellow is produced by the addition of the oxide of lead; red by the oxides of gold and iron mixed together; green by the oxide of copper; blue by the oxide of iron; violet by the oxide of copper; and black by the combined oxides of copper, cobalt, and manganese. When this substance is thoroughly reduced to powder, it is made into a pasty form by the addition of water. The moistened mass is then laid smoothly on the metal with a spatula, and, when dried, is melted or fired under a muffle in a small furnace. This process is repeated if the enamel is desired of extra thickness; but for art purposes the first or surface enamel has seldom more than two coats. With his white or black surface, as the case may be, ready for his drawing or decoration, the artist transfers to it the outline and shading of his picture in chalk or charcoal. Guided by this, he adds enamel from time to time, with his spatula, to make the required shadings and lines, by piling it up in some places and thinning it down in others. When a certain figure or object is partially completed, it is fired and then again covered with enamel, until it is completed to the satisfaction of the artist. So with the whole picture, which undergoes sometimes as many as fifteen or twenty firings before it receives its last firing and polish.

The Fine Lace Made by Machinery

was one of the most remarkable exhibits in the entire French Department. Hand-made lace of almost cobweb texture is exceedingly expensive, and in the cases devoted to its display there was a large robe valued at 800 dols., a single handkerchief at 200 dols., lace flowers at 400 dols. per yard, and so on through a superb collection. Yet all this exquisite material could be found in another case, perfectly imitated by machinery. There was a complete dress in *point d'Alençon*, in which the famous stitch peculiar to that lace was accurately produced. It would have required a skilled connoisseur to detect the material from that made by hand labour, yet the latter would be worth probably 5,000 dols., while the price asked for the machine lace was but 250 dols.

APPLICATIONS FOR LETTERS PATENT.

⁂ In this list (Com. means Invention communicated from abroad.

Further information, as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur-street, Charing Cross

On September 2d.—P. Kelley. Machinery or apparatus for combing wool and other fibrous substances.—C. Muoatori. Composition for waterproofing fibrous and other porous and absorbent materials, the compositions being applicable for the manufacture of paving and other like slabs.—A. Gruver. Frames of umbrellas and parasols.—W. W. Wilson. Machine for guaging and mixing concrete and other substances. —A. M. Clark. Method of and machine for printing woven and other fabrics (com.)—T. Green. Sweeping and mowing machines.—A. Challis. Apparatus for signalling on railways. —W. R. Lake Machine for dressing and cleansing skeins or hanks of silk and other spun materials.

On September 4th.—3477 to 3485.—C. Dawborn. Method of raising and lowering window blinds (com.)—H. Turner. Method and apparatus for raising sunken ships; partly applicable to raising other submerged bodies.—J. T. Lockey. Evaporation of brine and in the construction of apparatus employed therefor. C. Voysey. Apparatus in connection with ships or vessels to increase the stability and buoyancy of the same.—R. J. Hutchings. Machinery for cutting and shearing metal plates.—W. R. Lake. Manufacture of steel (com.) Complete specification.—J. Apperley. Construction of rotary steam engines.—J. Mountain. Sewing machines. A. M. Clark. Purification of gas (com.)

On Steptember 5th.—3486 to 3498.—A. Sykes and W. Whiteley. Machinery or apparatus for spinning and twisting worsted, woollen, cotton, and other fibrous substances.—E. E. Ashing. Solitaires and studs, and other similiar dress fastenings.—C. D. Abel. Motor engines worked by steam or other elastic fluid pressure (com.)—A. Macpherson. Apparatus for lowering and disengaging ships' boats. J. H. Johnson. Manufacture of carpets and rugs (com.)—W. Pratchitt and J. Pratchitt. Compound steam engines.—A. C. Herts. Spring clasp protector for trouser bottoms (com.)—J. W. Gidney. Apparatus for carburetting air or gas for illuminating or heating purposes.—J. Harper. Invalid or bed tables.—J. A. Kelman and J. Wilson. Cleaning tramway rails and apparatus to be employed therefor.—H. Gardner. Spinning machinery (com.)—A. M. Clark. Gloves (com.) —A. M. Clark. Machinery for obtaining motive power (com.)

On September 6th.—3499 to 3515.—W. H. Hacking and T. E. Wilson. Machinery for winding yarn.—F. W. Ritter. Wine and other cocks or taps.—J. Beale. Brakes for railway and other carriages.—S. Graham. Method of treating yarns.—J. L. Haddan. Machinery for mining (com.) (Complete specification.)—A. Fitzmaurice. Pumps.—H. Heyer. Ruler for ruling lines.—H. Heyer. Holder or file for holding papers and patterns and samples of woollen and other frbrics.—F. Chamberlain. Machinery or apparatus for moulding and pressing bricks, tiles, and other similar articles.—J. Holden and J. E. Holden. Machines for carding wool and other fibrous material. (Complete specification.)—J. Holden and J. E. Holden. Machinery for washing wool and other fibrous material. (Complete specification.)—R. C. Anderson. Valves.—F. Perks. Sewing machine shuttles (com.)—F. Perks. Sewing machines (com.)—W. R. Lake. Shawl (com.)—J. Kuntze. Brakes.—H. Gardner. Reduction of metallic ores and the manufacture of iron and steel therefrom, and the working and welding of such steel (com.)

On September 7th.—3516 to 3526.—E. Webster. Breech loading fire-arms.—E. Remy. Means and apparatus for extracting starch from rice and other cereals and fecula.—A. C. Henderson. Arranging, winding, and uniting yarn on two or more bobbins to form a single continuous thread, and holding devices for securing the ends of the yarn in doffing (com.)—B. Hunt. Apparatus for weaving looped and piled fabrics (com.)—H. W. Walker and T. L. Paterson. Treating residual liquids obtained in manufacturing or refining sugar, and apparatus therefor. H. Boddington, jun. Method of and apparatus for "rousing" fermenting liquors.—K. Procter. Construction of buttons and the method of fastening the same, part of which is also applicable to screw rivets used for fastening straps and other purposes.—G. G. Bussey. Stopping bottles, jars, casks, and other receptacles, and stoppers and taps for this purpose.—J. A. Clarke. machinery for tilling land.—G. C. Ryland. Railway chairs and the permanent way of railways.—W. H. Maw and J. Dredge. Pressure guages and pyrometers.

On September 8th.—3527 to 3543.—C. S. Robinson and G. Goldsmith. Appliances for securing the rails to the chairs used on railways.—C. S. Robinson. Burners for burning a mixture of gas and atmospheric air.—A. C. Henderson. Apparatus for clearing beds of rivers and watercourses, and rendering the same navigable (com.) —J. Gillman. Grave tablet for perpetuating the memory of the dead.—D. Hunter and D. Hill. Safety valves for steam boilers, and valves for other purposes.—J. Rogers. Box for containing pomatum, ointment, and other greasy substances.—W. C. Johnson and S. E. Phillips. Manufacture of submarine and other telegraph cables.—W. C. Johnson and S. E. Phillips. Insulators for telegraph wires.—J. Margotti. Stoppers for bottles and jars.—H. Bezer. Registering turnstiles, partly applicable to other registering purposes.—E. G Brewer. Telegraphic instrument chiefly applicable to the receiving of telegraphic messages (com.)—H. P. Garland. Sewing machinery.—H. H. Murdoch. Apparatus for the manufacture of sugar, partly applicable to other purposes (com.)—C. A Day. Machinery or apparatus for printing in various colours (com.)—T. Fielden, J. Fielden, and J. Fielden, the younger. Construction of continuous breaks for railway trains.—J. E. Phillips. Reaping, mowing, and grass-cutting machines, and apparatus for gathering and facilitating the binding of cut crops.—G. Duddell and T. Charlton. Apparatus for drawing and forcing water and air, applicable also for propelling vessels.

On September 9th.—3544 to 3551.—W. R. Lake. Hydraulic elevating machinery (com.) (Complete specification).—A. Martin. Apparatus for saving life and property in case of fire, applicable also for lowering weights for other purposes.—A. Harper. Wheels of carriages, perambulators, and other vehicles.—C E. Webber. Mode of utilizing gas for heating or other purposes, and the apparatus or means employed therein.—T. Mitchell. Construction of umbrellas.—R. Griffiths.—Discharging water from steam-ships and other vessels.—C. D. Able. Hot-air motor engines (com.)—J. H. Johnson. Treatment of the residues obtained in the purification of coal gas and the obtaining of product therefrom (com.)

On September 10th.—3552 to 3563.—R. Applegarth. Electric light (com.)—S. D. Keene. Cotton openers and cleaners (Complete specification.)—W. Wesley. Compound heels for boots and shoes. —H. Jones and E. Cook. Rolling hoop iron and the machinery used for that purpose.—F. R Clarke. Cutter blocks for moulding machines.—F. Dredge. Apparatus applicable to to the preservation of the original form of trousers and other garments, and to the prevention of what is known as "bagging."—F. Young and C. F. Deacon. Roller or wheel skates.—E. Partridge. Coach axles and their boxes or brushes—A. C. Ramlett. Reaping and mowing machines.—J. Hastie. Hydraulic motive power and pumping apparatus.—A. J. Alderman. Apparatus for use in stopping and controlling the motion of ships' cables,—C. P. Matthews and J. C. Davis. Composition for coating the insides of casks or other vessels.

On September 12th.—3564 to 3581.—B. Hunt. Manufacture of packing for steam and other pistons (com.) (Complete specification.)—F. Lord. Manufacture of mouldings or beadings for show-cases, picture frames, and other articles.—J. Robertson. Apparatus for stopping pumping engines.—J. D. Macdonald, M.P. Ventilating purposes, being a twin-fan automatic ventilator.—C. J. Ball. System of carriage shafts not liable to upset (com.)—H. Wilde. Manufacture of metal rollers for printing calico, and for other purposes.—C. W. Harrison. Extinguishing fires.—J. H. Johnson. Closets or receptacles for sewage matters, and the means of disinfecting or deodorizing such matters (com.)—W. C. Parker and J. Stabler. School furniture.—J. G. Jones. Apparatus for ascertaining, indicating, and registering the speed of steam ships, and other vessels, railway carriages, and other moving bodies.—H. Lister. Cooling woven or felted fabrics after the process of steaming or "blowing" or boiling in water. J. R. Danks. Feeding mechanism for cut nail machines.—W. White. Purifying or disinfecting sewage and other foul waters, and the preparation of disinfectants.—J. I. Mitchell. Carriages or vehicles to be propelled by manual labour.—B. Samuelson and W. G. Manwaring. Harvesting machines.—T. Hyatt. Useful and ornamental building materials as new manufactures, and buildings and building constructions made therefrom, and modes, means, and processes connected therewith.—H. G. Warburton. Method of winding hosiery yarn, and apparatus employed therefor.—H. Simpson and W. Reid. Fastenings and metallic framework of leggings, travelling bags, and other similar articles.

On September 13th.—3582 to 3594.—P. J. Livsey. Machines for printing or embossing spools (com.) —H. Vaughan and T. Vaughan. Manufacture of keys for locks, and the machinery for that purpose.—E. B. Smith. Refrigerators and other similar structures. (Complete specification.)—B J. B Mills. Ventilating, disinfecting and fog alarm apparatus for ships and other floating craft (com.)—H. J Cole. Apparatus connected with cleansing the bottoms of ships and other submerged structures.—P. H. Whittaker. Signalling apparatus.—E. Ham. Rim, mortise, and other latch locks.—J. Bennett. Apparatus or instrument for teaching the game of billiards. H. Jewitt. Fluting or goffering machines (com.)—R. Kilburn. Washing and scouring machines.—W. Clark. Construction of instruments for shearing sheep or other animals.—B Hunt. Preservation of alimentary matters, and apparatus to be employed therefor (com.) (Complete specification.) —F. P. E. Carré and E. Julien. Refrigerating, and apparatus therefor. (Complete specification).

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